THE DORSET CULTURE

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THE DORSET CULTURE

A COMPARATIVE STUDY IN NEWFOUNDLAND AND THE ARCTIC

by

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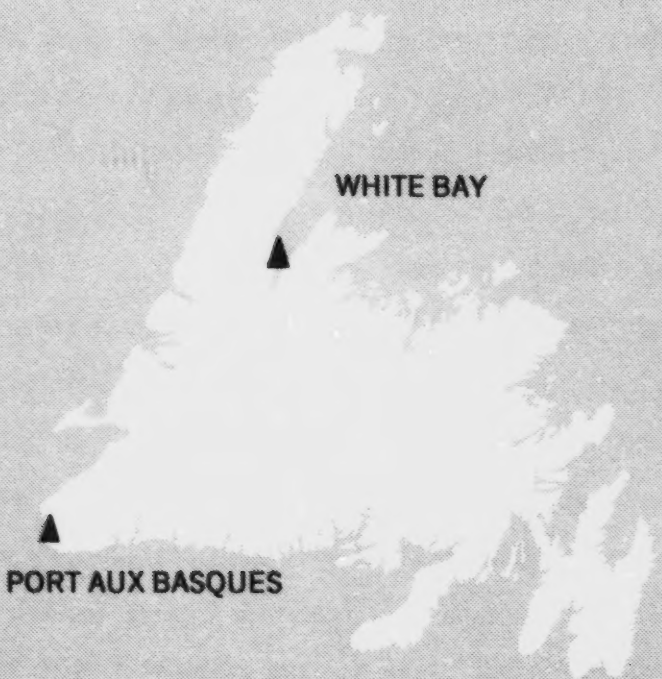

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Abstract

This study concerns the position of Newfoundland within the Dorset culture area and the nature of Dorset culture regional variation. For this purpose a detailed analysis of two archaeological sites from Newfoundland is presented. The Cape Ray Light site and the Pittman site were excavated during the 1967 field season and additional investigations were carried out in 1968.

The Cape Ray Light site is located on the southwestern corner of Newfoundland, near Port aux Basques. It produced a Dorset artifact sample of 4,797 lithic specimens and one organic specimen. The Pittman site, in White Bay in northern Newfoundland, produced 1,403 Dorset artifacts, all made of stone. Both sites were occupied for a fairly long period by Dorset peoples. Radiocarbon dates and artifact comparisons with Arctic sites indicate that occupation spanned the last centuries B.C. to the first half of the first millennium A.D. Both are coastal sites and were probably spring and summer base camps used for seal hunting and fishing.

Data from these two sites is augmented and combined with data from other sites to develop a definition of the Dorset complex in Newfoundland. The chronological position of this complex is determined both by artifact comparisons with the Arctic and by a synthesis of Newfoundland radiocarbon dates. A majority of Newfoundland lithic artifact classes and attributes indicate both an early and middle Dorset age. Very few traits are exclusively early or exclusively late. This dating is supported by radiocarbon dates that cluster between 400 B.C. and A.D. 700. Comparisons of overall artifact resemblance between Newfoundland and Arctic Dorset are next carried out, indicating a strong similarity between the two. Differences are present, however. Most of the major

differences are at the attribute level and a few major class differences were found between the two areas. Similar settlement and subsistence patterns between the two areas indicate that no major differences in environmental adaptations are present.

Finally, some factors that may have contributed to the development of a distinctive Dorset complex in Newfoundland are discussed. Adaptation to the sub-arctic environment of Newfoundland by means of major shifts in material culture did not take place. The hunting tool-kit, settlement and subsistence patterns are broadly similar in the two areas. The distinctive nature of the Newfoundland complex, mainly involving stylistic changes in the making of artifacts, can best be explained by the geographic isolation of Newfoundland from the Arctic and core area of Dorset culture. Communications to this southern area, as well as to other areas on the western and northern periphery, were probably poor and only intermittent. Communications may further have been disrupted during past periods of unfavourable climate. Contemporary non-Dorset cultures may also have influenced Dorset culture in Newfoundland but data from such cultures is presently lacking.

This study concludes that the Newfoundland regional variant of Dorset culture developed because of cultural isolation in a geographically peripheral location with regard to the Dorset culture area.

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PART ONE

INTRODUCTION

OUTLINE OF ARCHAEOLOGICAL RESEARCH

This study concerns the Dorset culture manifestation in Newfoundland. It is based on the excavation of two sites--one along the northern coast in White Bay and the other at the south-western corner of the island near Port aux Basques. These excavations have produced evidence concerning the nature of the Dorset culture in Newfoundland and added two sites to the roster of Dorset sites described and excavated by Harp on the west coast of Newfoundland (1964a; 1964b). These two new sites extend our detailed knowledge about Dorset beyond the west coast of the island and establish a basis for a definition of the Newfoundland aspect of this culture. The sites produced a large sample of lithic artifacts, some evidence for living-quarter arrangements, increased knowledge of Dorset ecological adaptations and a series of radiocarbon dates.

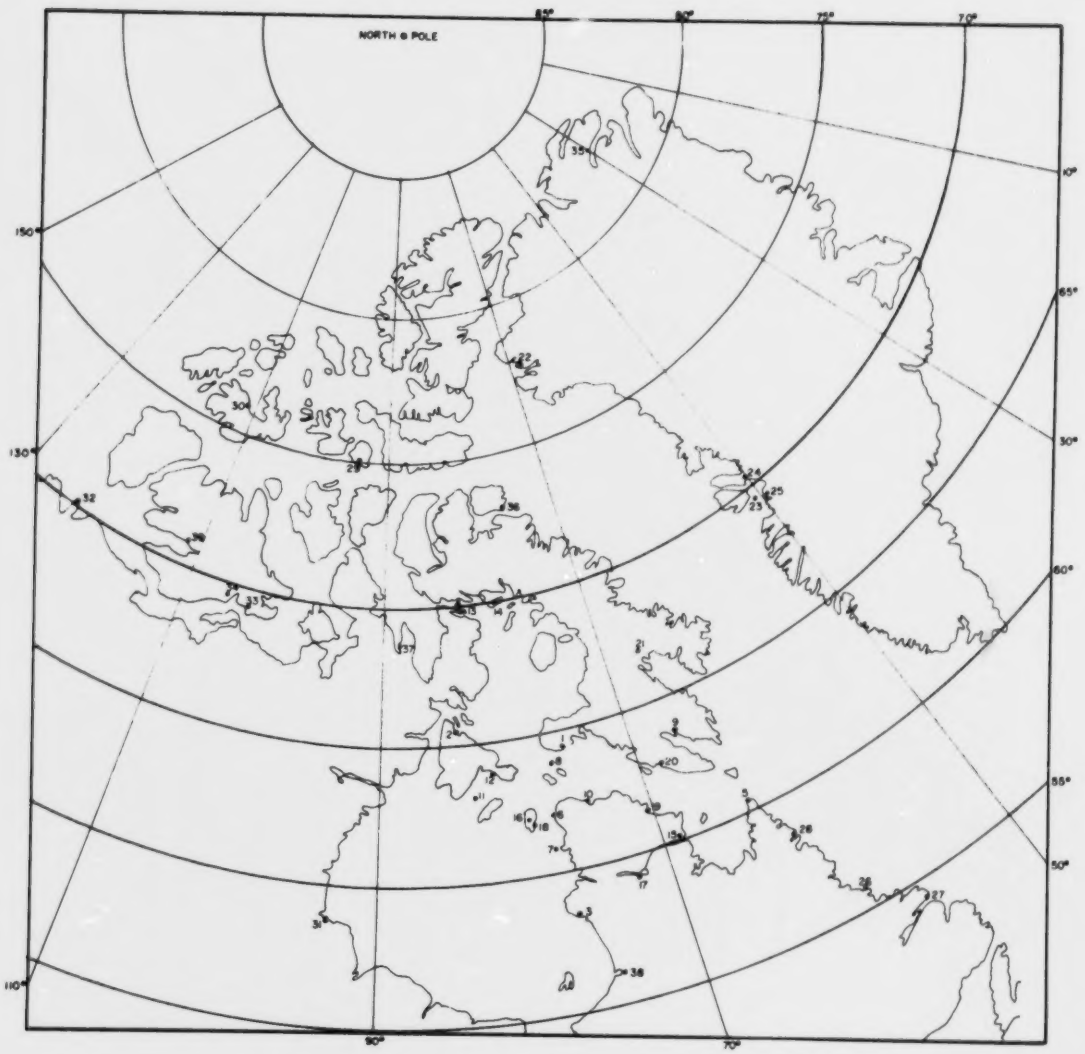
Although the distribution of Dorset sites extends over a very extensive area, within a triangle that measures roughly 1500 by 2400 by 2400 miles, the quantity and quality of sites vary considerably. Many of the sites are very small and a great number of the reports are brief and preliminary statements of surveys or short tests carried out at what seem to be major sites. Within the Dorset area the spatial coverage is therefore rather spotty. Some regions are well known and have been intensively studied, while others have only been surveyed or tested. The best known regions, where major excavations have been carried out and the results have been published, are northern Greenland, southwestern Greenland, the Foxe Basin-Hudson Strait regions and Newfoundland. It is not yet clear whether the proliferation of sites in these areas reflects an actual concentration of Dorset occupation or the amount of research that has been carried out. Fortunately for the present study these areas

are in the eastern part of the Arctic and, relatively speaking, bordering on Newfoundland. This allows comparisons of the Newfoundland subarea to be made with at least its immediate neighbours to the north.

The roster of Dorset sites (see Fig. 1) begins with the definition of the culture by Diamond Jenness in 1925. He based his definition on a collection sent to the National Museum of Canada from the Cape Dorset region of southern Baffin Island. As far as I am aware these sites have never been excavated by professional archaeologists. Cape Dorset is situated almost in the middle of perhaps the richest region of Dorset sites in the Arctic--the Foxe Basin-Hudson Strait area. Subsequent finds in this region have demonstrated this observation.

Mathiassen (1927) visited the Kuk site, on Duke of York Bay, northern Southampton Island as part of his work on the Fifth Thule expedition. This site contained bone and ivory harpoon and lance heads that belonged to the Dorset culture, but no stone artifacts have been reported from it. In the same report a small collection of Dorset material was noted as originating from the Port Harrison area of northwestern Ungava. Jenness in his 1925 publication also mentioned that Dorset artifacts had been collected from Coats Island, Southampton Island and Chesterfield Inlet, but it was not until 1940 that further investigations were made in this region. Graham Rowley (1940) excavated a fairly substantial site on Abverdjar Island in northern Foxe Basin, from which he recovered about 1500 specimens, approximately one third of which were made of stone. The closed socket harpoon head with a line hole parallel to the socket indicates that this site may belong to later phases of Dorset.

On the opposite periphery of the area under discussion Leechman (1943) reported on a site from Killinek Island just off the northern



SOME ARCTIC SITE LOCATIONS MENTIONED IN THE TEXT

SCALE 0 100 200 300 miles

KEY

1 Cape Dorset
2 Kuk
3 Port Harrison
4 Akverdjar
5 Kidnapk Island
6 Nuvuk Island
7 Smith Island
8 Mill Island
9 Crystal 2
10 Tyara
11 Alpirus Island
12 Native Point (T1, T2, T3 sites)
13 Igloolik
14 Jens Munk Island
15 Imaha
16 Mansel Island
17 Payne Lake
18 Arnapik
19 Jay Bay
20 Lake Harbour
21 Cumberland Sound
22 Thule - Invorfigsuaq
23 Disko Bay
24 Sarqaq
25 Sermermiut
26 Hopedale
27 Hamilton Inlet
28 Saglek
29 M2
30 McCormick Inlet
31 Sea Horse Gully
32 Cape Parry - Bernard Harbour
33 Cambridge Bay
34 Wellington Bay
35 Independence Fiord
36 Pond Inlet (Button Point)
37 Petty Bay
38 Richmond Gulf
39 Prince Albert Sound - Jose Site

Figure 1

tip of Labrador. The sample contained a large amount of chipped stone material but no dating of the site has been attempted. In the same publication he also outlined his work at a Dorset site on Nuvik Island, near Cape Wolstenholme on the northwestern corner of Ungava. There was also a considerable amount of stone materials here and, judging by the harpoon types present, the site seems to date to middle or late Dorset. Not too far away, on Smith Island, Manning investigated a mixed Thule-Dorset site that produced some typical chipped stone material, and some of the harpoon heads again indicate a late date within Dorset (Manning 1951). In 1951 O'Bryan excavated a Dorset house at a small site on Mill Island in the western end of Hudson Strait (O'Bryan 1953). The collection from this site produced bone and stone artifacts that appear to be influenced by Thule culture, making this site one of the few extremely late Dorset sites known.

In 1948 Collins began his archaeological researches in the Foxe Basin-Hudson Strait area. One of the first sites that he investigated and reported on was the Crystal II sites on Frobisher Bay (Collins 1950). This site had a Dorset layer below a Thule layer and was the first to produce stratigraphic evidence for the relative positions of these two cultures. There was also much chipped stone material and a little ground slate in the artifact sample from this site. Collins presented a typology of harpoon heads in his report, again a first in Dorset archaeology. Comparing Crystal II harpoons with his early Tyara site specimens, Taylor (1968b) concludes that Crystal II may date to middle or late Dorset.

In 1954 and 1955, Collins continued his work in the area, this time concentrating on Southampton, Coats and Walrus Islands. Walrus Island produced a middle period Dorset site while on Southampton Island several early Dorset sites were excavated. The most prolific of these

was the T_1 site near Native Point (Collins 1956a; 1957; 1958). This early Dorset site produced a large sample of chipped stone artifacts, and a detailed description of these has been published (Collins 1956b).

As a result of field work in 1954 and 1957 Meldgaard located important Pre-Dorset and Dorset sites in the Igloolik area of northern Foxe Basin (Meldgaard 1960a, b; 1962). The large Alarnek site extends over a series of raised beaches that seem to have been occupied almost continually from Pre-Dorset times up to terminal Dorset at about A.D. 1350. Meldgaard has divided the Dorset material into five periods but the rich samples of bone, ivory, antler and stone tools have not yet been fully described and published. Meldgaard has also briefly reported on other Dorset sites nearby, such as the Jens Munk site, the Tikilik site and the Freuchen site. The Igloolik area seems to be especially rich in Dorset and earlier material.

Moving back to the southern periphery of the Foxe Basin-Hudson Strait area, Taylor carried out field work along the northern coastal areas and on the islands off the Ungava Peninsula in 1957, 1958 and 1959 (Taylor 1958; 1959; 1960). The Imaha site produced a small sample of Dorset artifacts and one burial. In the interior several sites were found at Payne Lake (Taylor 1958). This has more recently been investigated by Lee (1966; 1967) and from the specimens illustrated an idea of the nature of inland Dorset can be formulated. Taylor (1959) located 13 sites on Mansel Island, one of which produced skeletal material. These sites seem to vary in age from early to late. He also visited the site on Nuvuk Island previously reported by Leechman (1943), and found a series of Pre-Dorset sites near Ivuqivik. Amulet Creek on Mansel Island furnished a series of sites of which the Arnapik Pre-Dorset site in combination with the Tyara site from Sugluk Island formed the basis

of a dissertation by Taylor which was later published (Taylor 1968b). This report includes detailed information on Dorset chipped stone artifacts as well as bone, ivory and wooden implements. Taylor (1963) has also presented a brief description of Dorset sites in the Joy Bay area, based on the information of Saladin d'Anglure, who was in the area studying possible Dorset petroglyphs.

Since 1960 Maxwell has been carrying out archaeological work in southern Baffin Island, in the Lake Harbour area (Maxwell 1962) and more recently in Frobisher Bay (Taylor 1968b). In the Lake Harbour region the many sites found have been grouped into five assemblages that form a continuum from Pre-Dorset to early, middle and late Dorset.

It seems misleading to end on a discouraging note in an area seemingly so rich in Dorset remains as the Foxe Basin-Hudson Strait region, but Schledermann, on an intensive survey of Cumberland Sound in 1971, found very little Dorset or Arctic Small Tool material, though these were specifically looked for on the higher beaches (Schledermann 1971). Perhaps this easterly Baffin Island area is indeed on the periphery of intensive Dorset occupation and forms a boundary or limit to the central core region.

Western Greenland is another area that has produced a significant body of data concerning the Dorset culture. Holtved, during an extensive programme of archaeological work in 1936 and 1937 in the Thule District, located several sites, especially in Kane Basin, that contained Dorset components (Holtved 1944). One of the largest of these, Inuarfigssuaq, seems to date to terminal Dorset. Farther south, the Disko Bay area is another region prolific in Dorset remains. Collections have been made from sites here since the 19th century and one of these, Sarqaq, has been described by Meldgaard as being Paleo-Eskimo (Meldgaard 1952).

Sarqaq is also considered to be related to the Arctic Small Tool tradition, perhaps a late expression of Pre-Dorset in Greenland. In 1953, Larsen and Meldgaard partly excavated the stratified site of Sermermiut in the Disko Bay region. The Dorset component from this site produced a good sample of stone artifacts, fully described in the report (Larsen and Meldgaard 1958). The site also furnished material for pollen analysis and a sequence of climatic change was reconstructed to accompany the sequence of cultural change indicated by the stratigraphy of the site. A survey of Disko Bay that was carried out at the same time produced a further 22 sites. These have been seriated by Taylor and they may form a continuum from Sarqaq to Dorset (Taylor 1968b). In 1955 Mathiassen returned to continue work at the Sermermiut site and further increased the sample of Dorset material. He was also able to date the Dorset component to the 1st century A.D. by means of radiocarbon (Mathiassen 1958).

Connecting these two Arctic areas to Newfoundland is Labrador. Unfortunately until very recently not much archaeological work had been done in Labrador. In 1930 Strong reported on a series of sites with lithic remains and proposed that they belonged to the Old Stone Culture. Very little if any of this material appears to be Dorset. As a result of his work in the Hopedale region Junius Bird showed that Dorset was present but the material was rather scanty and mixed with later Thule artifacts (Bird 1945).

Fitzhugh's Hamilton Inlet work in 1968 and 1969 first discovered substantial Dorset remains in Labrador (Fitzhugh 1972). His sites are mostly of an early Dorset variant which he calls the Groswater phase, and the lithic remains indicated a regional variant that is different from the type of Dorset that occurs in Newfoundland. In 1969 Tuck began a programme of archaeological work at Saglek in northern Labrador

and continued this in 1970 and 1971. Although only a preliminary paper has appeared, excavations are reported to have produced five Dorset components and about a dozen small sites that have dated from 2485 ± 185 B.P. to 1850 ± 100 B.P. (Tuck 1971a).

In Newfoundland the Dorset culture is relatively well-known (see Fig. 2). In his 1915 compendium, Howley has illustrated Dorset material from several areas, ranging from Placentia Bay to Notre Dame Bay. The first archaeological work to be done in the province in the 20th century was carried out by Jenness in 1927. He surveyed the coast from the Bay of Exploits to Canada Harbour on northern White Bay (Jenness 1928; 1929). His finds included such typical Dorset artifacts as triangular end blades and harpoon heads, but Jenness interpreted the affinities of the collection as Beothuk and went on to conclude that Dorset and Beothuk were closely connected.

In 1929 Wintemberg surveyed the west coast from Cape Riche to Bonne Bay, locating several Dorset sites and reporting in detail on the material found (Wintemberg 1939). Harp, following up on these initial discoveries, carried out two seasons of field work in 1949 and 1950, concentrating on the west coast sites. Summary statements of the results were published in 1951 and 1953, and in 1964 a complete report of the excavations was published (Harp 1964a). Subsequently in 1961, 1962 and 1963 Harp returned and continued excavating the large and prolific Port au Choix-2 site (Harp 1964b). Several Dorset burials were also recovered during these field seasons (Harp and Hughes 1968). The results of these later investigations have yet to be published fully. Helen Devereux during 1964, 1965 and 1966 located and excavated several Dorset components in the course of her research concerning the prehistory of the Beothuk. One of these sites, the Pope's Point site, was an inland site, the only

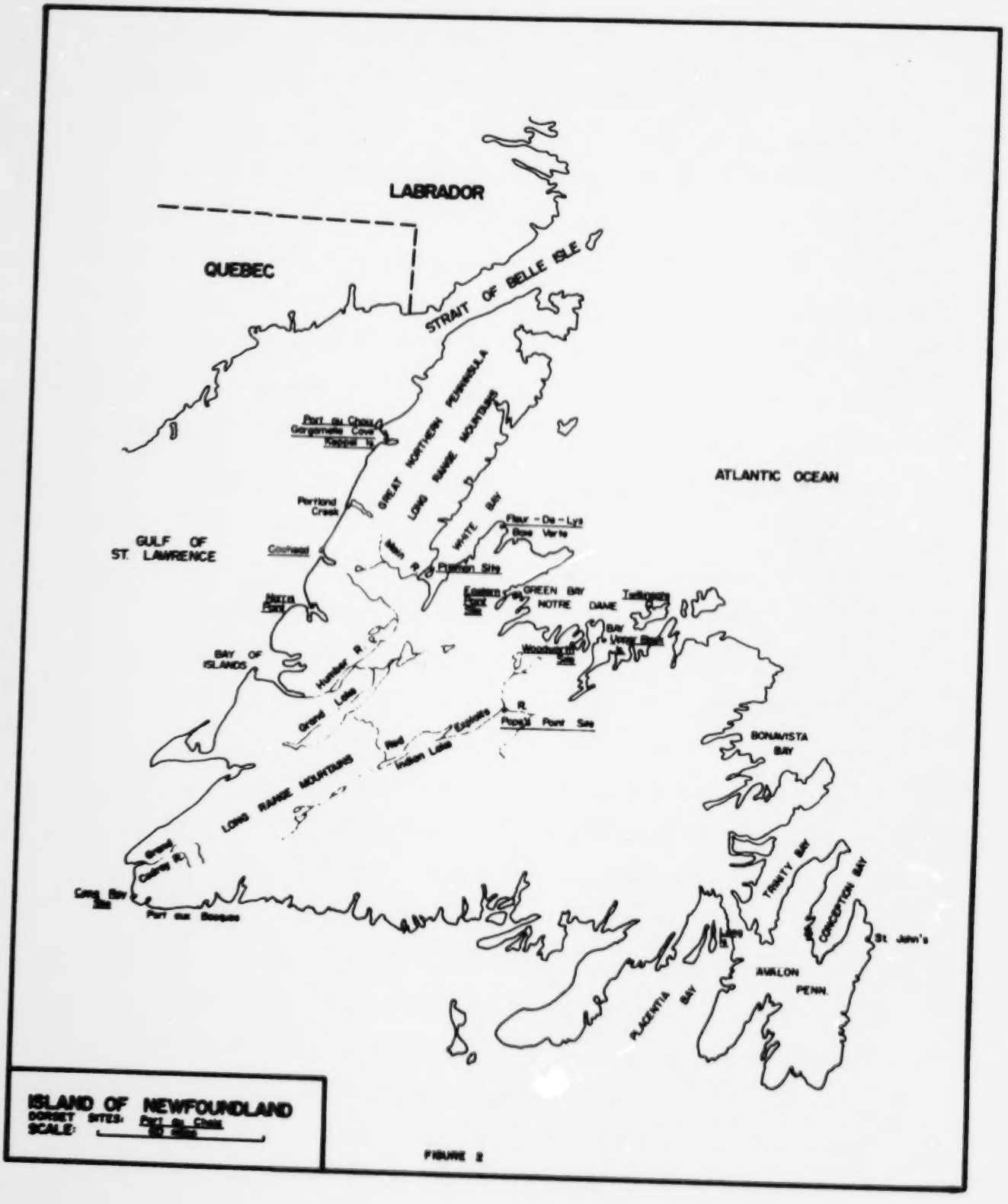

LABRADOR
QUEBEC
STRAIT OF BELLE ISLE
ATLANTIC OCEAN
GULF OF ST. LAWRENCE
GREAT NORTHERN PENINSULA
LONG RANGE MOUNTAINS
WHITE BAY
Port au Choix
Portland Creek
Pointe Riche Site
GREEN BAY
NOTRE DAME
BAY OF ISLANDS
Humber R.
Grand Lake
Red Indian Lake
Exploits R.
Phillip's Point Site
BONAVISTA BAY
TRINITY BAY
CONCEPTION BAY
St. John's
AVALON PENN.
PLACENTIA BAY
Port aux Basques
ISLAND OF NEWFOUNDLAND
DORSET SITES: Port au Choix
SCALE:

FIGURE 2

such Dorset site known in Newfoundland, and the others were on the northeastern coast from White Bay to the Bay of Exploits. Though this material also has not been published the writer has seen most of the collections and has obtained copies of unpublished reports concerning these sites. In addition to the work carried out by the writer in 1967 and 1968, which forms the basis of the present study, a survey of Placentia Bay was carried out in 1970 (Linnamae 1971). This survey located several Dorset sites in a previously unexplored area of the island and indicated that the Dorset occupation of Newfoundland extended to the southeastern coastal areas and perhaps around the entire island. In 1966 during his work in Twillingate on some Maritime Archaic burials, Donald MacLeod located a large Dorset site. The collection from this site is stored at the National Museum in Ottawa and has not been analysed.

The areas discussed above are those best documented, and seem to be rather prolific in Dorset material. Many sites have been reported in the Foxe Basin-Hudson Strait region. Major and extensive reports have appeared on the T_1 site on Southampton Island and the Tyara site on Sugluk Island. Both of these sites belong to the early period of Dorset. The sites in the vicinity of Igloolik have provided important information on the development and change of artifact forms through time. In western Greenland the Sermermiut site produced a large sample of Dorset lithic artifacts dating to the 1st century A.D. Two publications have appeared describing these collections. In addition, many smaller sites in Disko Bay were also included in these reports. Newfoundland Dorset is well known from Harp's work in the Port au Choix area and additional information has been provided by Devereux and Linnamae. In the last few years we also have obtained some information from Labrador, a possible connecting link between these areas.

There are Dorset sites that are further removed but still of comparative value for the Newfoundland material. These include the M2 site near Resolute Bay, Cornwallis Island (Collins 1955), a site on McCormick Inlet, Melville Island (Taylor 1964a), the Dorset site at Sea Horse Gully near Churchill (Nash 1969), sites from Cape Parry to Cambridge Bay in the western Arctic (Taylor 1964b: 1967; 1972) and sites on the western coast of Victoria Island (McGhee 1971).

SUMMARY OF DORSET CULTURE

Dorset culture occupied a rather large area, extending from western Victoria Island to northeastern Greenland to southern Newfoundland. The radiocarbon dates available indicate that it originated around 800 B.C. and late sites showing Thule influence indicate that it may have lasted until A.D. 1300 or later, at least in the Nouveau Quebec region. As a general background for this study a brief summary of the nature of Dorset culture will be given. This is based on the much fuller and more comprehensive one outlined by Taylor in his recent study of Dorset culture origins (1968b).

A dominant trait of Dorset material culture is the manufacture of implements by means of chipping stone such as chert, quartz and quartzite in a manner reminiscent of the Arctic Small Tool tradition. Besides the use of flakes for preforms the Dorset culture relied on blades and microblades struck from prepared cores. Chipped stone material is relatively small in size and delicately well-made. In some cases the chipping technique consists of transverse linear and parallel flaking across the surface of the artifact. Prolific and common classes of artifacts are the triangular end blade that probably was used to tip harpoon heads, and several kinds of steep-edged end scrapers. Occurring with lesser

frequency are side-notched end blades; asymmetrical bifacial knives; concave side-scrapers; burin-like tools, side blades; varieties of ground slate implements; rectangular vessels and triangular or round lamps made from soapstone; pebble choppers, hammerstones and mauls; used and retouched flakes; and finally great amounts or rejectage of debitage consisting of small retouch chips, flakes, chunks and shatter. The true burin with unground facets that is the hallmark of the Arctic Small Tool tradition is almost absent in Dorset, occurring only in a few early sites. It seems to have been replaced in function by the burin-like tool with ground facets.

Organic implements include bone harpoon heads in several varieties; large lance heads; fish spears; knife and scraper handles; flint flakers; adze heads; wooden throwing boards; and sled shoes, but no dog harness parts. Bone, antler, ivory and wood carvings of animal and human figures, sometimes intricately decorated with incised lines, are the remains of the artistic endeavours of this culture.

Living structures included the round skin tent, a subterranean rectanguloid house and perhaps the snow house. From the scant evidence available, burials were placed in rock shelters, stone vault graves, stone lined pits or gravel mounds, and were covered by red ochre. Dorset culture lacked features that were important to other Arctic cultures. These include pottery, the bow and arrow, dog traction and the use of the bow drill. All holes in bone, wooden and soapstone artifacts have been made by incising and gouging. At present there is no direct evidence for any form of boat, but because of the coastal and insular location of sites it is probable that some form of water transportation was used. Of course, in an Arctic area boats are not essential for crossing water nor for the hunting of sea-mammals, but they do contribute to

a degree of mobility and effectiveness which the Dorset culture people seem to have had.

The Dorset subsistence economy was based on the hunting of sea-mammals, especially seals. Caribou, fish, birds and walrus were hunted, depending on the season and the region. Obtaining such a diversity of game, which was essential for general livelihood, entailed a certain amount of movement from one season to the next and from one area to another. The Dorset life-way was therefore semi-nomadic. The sizes of sites and arrangements of dwellings seem to indicate that groups were usually of the size of small bands that occasionally may have joined to form some type of macro-band.

A major problem which has occupied researchers of Dorset culture in the recent past has been the origin of this culture. In the central and eastern Arctic the Dorset period occurs almost immediately after the Pre-Dorset period, which belongs to the Arctic Small Tool tradition. The strong similarities between the chipped stone material from Pre-Dorset to Dorset, have led Taylor to conclude that "there was a clear, basic cultural continuity from Pre-Dorset to Dorset culture in the Canadian eastern Arctic and, within this area, Dorset culture developed in situ" (1968b:viii). So far, his study is the only one to present a major, comprehensive review of material to support that conclusion. Another view concerning Dorset origins has been presented by Meldgaard (1960a and b). He has suggested that one basic source of Dorset culture derives from the southern forest regions, and especially from the Archaic and early Woodland cultures of the Northeast. Meldgaard has yet to publish fully on his excavations in the rich Igloolik area, where he has sites showing the evolution of Dorset culture from its beginnings to its late periods. Until these findings are published, it remains difficult to

assess these conclusions.

Other major problems remaining to be systematically investigated concern how Dorset culture changed through time and the nature of its regional variability.

Archaeologically known sites include a number of early, middle and late manifestations and in broad terms the total Dorset time span is adequately represented by these materials. In addition there are several site areas, such as Iqloolik and Lake Harbour, where continuous sequences covering long periods of time have been found. Using material from reasonably well-dated sites, a picture of artifact and attribute change through time is beginning to emerge.

In the meantime, the following may be offered as a tentative model of temporal changes of the Dorset lithic complex (see also Table 2). Only two lithic classes were found to be confined to the early period. These are unground burins and multiple, side-notched ground slate end blades. The middle period, also, has few distinctive classes. Some of these may be semi-lunate side blades, end-of-blade end scrapers and ridged-platform polyhedral cores. Similarly, the late period has few distinctive indicators. Stemmed chert end blades and stemmed, ground slate end blades seem to be the only two classes that qualify. Changes in time appear to be gradual rather than restricted to sharply demarcated periods. The middle period is essentially a transitional phase since early and middle periods have many features that do not appear in later periods and similarly the early period lacks elements found in both middle and late periods.

These patterns may be considered to be generally applicable to Dorset culture as a whole but temporal patterns on a regional basis may be somewhat different. In such a far-flung and varying area as the

Arctic, regional differentiation seems to be a common development and has occurred in both recent Eskimo and Thule cultures. The development of internal differentiation within Dorset remains to be systematically investigated.

PROBLEM STATEMENT AND METHODOLOGICAL OUTLINE

This study will attempt to determine to what extent Dorset culture in Newfoundland was a distinctive sub-areal expression or unit when compared to other areas of the Arctic. The information and material obtained by the author from the Cape Ray Light site and the Pittman site will be augmented by other available data from Newfoundland. A synthesis of this data will be used as a basis for a defining statement concerning the nature of the Newfoundland aspect of Dorset. The Newfoundland aspect will then be compared to other areas, especially neighbouring ones, such as Labrador, the Foxe Basin-Hudson Strait region, and western Greenland. Such a comparison will indicate the degree and nature of difference and similarity between them. Lastly, an attempt will be made to explain the factors causing sub-regional variation within the Dorset culture area.

Several workers have already dealt with the problem of establishing and defining the larger or macro-cultural unit of which Newfoundland forms a part. Harp, by means of a comparison of primary and secondary traits for all sites found up to 1952 was able to propose a definition of Dorset that encompassed Arctic sites as well as the Newfoundland material (Harp 1964a). Taylor (1968b) again indicated the overall homogeneity of Dorset and contrasted this with the preceding Pre-Dorset culture in the eastern Arctic, although he was trying to show the similarities between the two and thought that Dorset evolved from a Pre-Dorset substratum. Most Arctic archaeologists now agree that Dorset does indeed

have the status of a distinct culture. Dorset sites have a relatively continuous spatial distribution and are confined to a specific period of time from 800 B.C. to A.D. 1300 or perhaps later in some areas. Dorset culture seems to satisfy Clarke's characteristics for a valid cultural assemblage. These are that the component parts of a cultural assemblage share a large number of artifact types with each other, that these traits occur together repeatedly in the component assemblages, that the traits represent most spheres of material culture and socio-cultural activity and that the culture occupies a limited, defined and continuous spatial and temporal dimension (Clarke 1968:231).

The existence of variation within a cultural assemblage is normal and expected, as no situation is known where 100% of the traits of a culture are present in all its spatial components. The problem involves determining whether the variation within a culture is regular, clear and significant enough to warrant defining smaller units within it that may be termed subcultures. Subcultural units must have some internal consistency and some external differentiation; or, in the words of Clarke, they may be defined as "an infra-cultural segment or activity alignment characterized by a specific type complex--a polythetic set of different and specific artifact types repeatedly found together in assemblages within a population of assemblages" (1968:235). The methodology of establishing a specific type or trait complex can be summarized as a process of comparing material from one area to another and noting distribution frequencies for the traits compared. As outlined by Clarke the steps involved consist of a synthesis of the types for the total cultural assemblage, the range of types that are shared between sub-assemblages and the total culture, the types that characterize the component assemblage, and the types that are unique to the component assemblage

(1968:249). In Dorset archaeology no types, in Clarke's sense, have yet been established. Rather, artifacts are described in classes that share certain morphological and functional characteristics, but may vary in other important traits. Thus one of the more common Dorset lithic forms, the triangular end blade, is similar in size, shape and function throughout the area but varies in finishing attributes such as edge serration, basal grinding and tip fluting or thinning. When dealing with the problem of subcultural variation in Dorset a combination of change in attributes from area to area and change in frequency of artifact classes has to be utilized.

Subcultural variation within Dorset culture in general and of Newfoundland Dorset in particular can be described as regional variation. Reasons for regional variation may be poor inter-communication and growing isolation between branches of a single culture due to geographical, genetic, or ecological reasons. Very often this happens in areas where different and discrete ecological niches are occupied by a single culture. Regional differentiation also occurs in a large and expanding cultural area consisting of many groups that are removed from each other and perhaps exploiting differing environments. These factors have some relevance concerning the spread of Dorset culture across the Arctic and down into Newfoundland, and will be examined in more detail later.

Because of the nature of the evidence, this study has to rely on an examination of the lithic tool-kit of Dorset. This tool-kit, which presumably originated in the Arctic and was adapted to Arctic conditions, does not seem to have changed drastically in the subarctic environment of Newfoundland. This tool-kit seems to have been as well adapted to the Newfoundland environment as it was to that of the high Arctic. This may be due to the presence in Newfoundland of similar food animals such

as the seal, caribou, and salmon, which the Dorset culture people had previously relied on in the Arctic. In other words, the Newfoundland environment allowed them to carry on similar types of subsistence activities. Differences did probably occur in the heating, housing, clothing and transportation sectors of the technology, but not enough evidence has been recovered to follow these changes precisely. One thing does stand out--the relative scarcity of soapstone lamps in Newfoundland. This may indicate that open fires were used in this wood-rich area for heating, lighting and cooking. Though the material in Newfoundland can easily be recognized as Dorset in its overall characteristics, there are distinctive traits within it to indicate some form of regional development.

The material of this study has been arranged as follows in order to deal with the above interests and problems: Part Two gives a general background and introduction to the environment of Newfoundland and then goes on to describe both sites, the excavations carried out and the results produced. The next section attempts to define Newfoundland Dorset by showing first the similarity of the two sites presented and the similarity of this material to other Dorset sites in Newfoundland. Then a comparison of Newfoundland Dorset to several Arctic areas is made to indicate the position of Newfoundland within the Dorset world, and attempts an explanation of the nature and position of Newfoundland Dorset. The concluding statement outlines problems raised by this study both for Newfoundland archaeology and Arctic archaeology in general. Part Three describes the artifact sample recovered from each site within a system of morphological and functional categories and classes.

PART TWO

EXCAVATIONS & INTERPRETATIONS

Site Descriptions

GENERAL ENVIRONMENTAL SETTING

The island of Newfoundland forms part of a geological unit called Greater Acadia. This unit includes the New England states, the Maritime Provinces and the Atlantic continental shelf in this region (Gutsell 1949:3). The major topographic structures and surface features of the island were formed during a mountain-building period during Ordovician and Devonian times. These mountains were further deformed and altered by movements at the close of the Paleozoic, during the Appalachian Revolution. The result of the folding and faulting during these periods of stress was to produce northeastern oriented topographic features. The Long Range Mountains as well as major drainage channels are aligned in this direction along both the east and west coasts of the Island. A final period of Pleistocene submergence produced the present deeply indented coastline with fiords and many off-shore islands (Gutsell 1949:4). The Long Range Mountains themselves have been considerably worn down by erosion, and now barely exceed 2500 feet above sea level.

During Pleistocene times, most, if not all, areas of the island were glaciated. This is presumed to have taken place during the Wisconsin period, although this has not yet been confirmed by radiocarbon dating (Jenness 1960:163). The ice centres were in the northern and western areas of the island, presumably in the Long Range Mountains, from whence the ice moved towards the coast to the east and west. The major results of glaciation were the scouring of rocky uplands to bare bedrock and the

deposition of till and drift material in the lower valleys (Twenhofel and MacClintock 1940b:1755). The deposition of glacial debris very often disrupted and disorganized the previous drainage patterns, causing extensive low-lying areas to become poorly drained swamps and marshes.

The climate of Newfoundland belongs to a cold marine type, due to the influence of the cold Labrador Current which sweeps down from the Arctic and extends along both the east and west coasts. At times and in certain areas, the climate is almost sub-arctic while at other times it is quite temperate, especially when warm currents and winds from the south are able to penetrate into the region. Mean temperatures in January range from 23°F at St. John's to 9°F at Belle Isle. Mean July temperatures do not often exceed 60°F. Winters are generally long and cold, with frequent thaws, and summers are short and cool with a few warm spells (Gutsell 1949:16-17). Precipitation is abundant and evenly distributed during the year, ranging from 30 inches in the north to 60 inches in the south. In the winter, there is usually two or three feet of snow constantly on the ground for about four months.

Where soil, drainage and winds allow, the climax vegetation appears to be a boreal, coniferous forest with a minor element of hard woods such as birch and maple (Gutsell 1949:27). The extensive areas of poorly drained bog and marsh are treeless and tundra-like, with black spruce and tamarack growing occasionally around the edges. Coastal regions, being exposed to high winds and consisting very often of bare rock outcroppings, have few trees and then only of the stunted variety in sheltered, lower lying, soil-filled basins.

The glaciers have also had a detrimental effect on soil formation by removing and destroying soil layers. The majority of the soils are shallow and infertile and belong to the podsolic group. Poorly-drained

areas have developed organic soils such as peat and gley. The production of a good humus or topsoil layer is very slow and only takes place in well-drained sheltered areas with a good vegetation or forest cover. These areas form locations for modern day settlements, as they did in prehistoric times.

Perhaps the most important element of the environment for a group such as the Dorset is the nature and habits of the fauna. Taylor has characterised the Eskimo economy as being omnivorous, and he further states that "Eskimo economies are neither inland or coastal-adapted but rather Arctic-adapted (and to some degree, occasionally sub-Arctic adapted), and the degree to which different species are exploited reflects primarily the environment and the faunal resources" (Taylor 1968a:15). Most Dorset sites are coastal and usually reflect a sea-mammal hunting subsistence pattern, but there are also examples of inland caribou based sites and coastal caribou and fish based sites. Each of these, naturally, reflects the availability of faunal resources.

With one exception, all Dorset sites that have been reported in Newfoundland are located on the coast. The coastal situation of these sites allows the easy exploitation of sea-mammals and other marine fauna that are generally prolific in Newfoundland waters. The harp seal is probably the single most important and prolific species available to coastal hunters, at least during the spring. These highly gregarious animals move down from the Arctic on the Labrador Current and seem to inhabit the open waters south of Newfoundland during January and February (Mansfield 1967:12-13; Sergeant 1963:31). In late February, they come back to the pack ice, which by now is adjacent to most of the west, north and east coasts of the island, to whelp. In historic times, the main breeding areas were near the Strait of Belle Isle, but very often

as ice conditions shifted and changed, the herd drifted south of here, both into White and Notre Dame Bay and down the west coast almost to Cabot Strait. A "patch" or dense grouping of seals stay in these regions up to the last half of April, after the pups are born, to mate and later to moult (Mansfield 1967:13). During this time, when the seals are on the ice, they are easy to catch and boats are not needed as the ice extends to shore and the hunter can walk up to his prey. A small group of hunters could catch enough seals to build up a surplus to sustain the group during other seasons as well. At the Port au Choix-2 site, on the west coast of Newfoundland, where middens containing food bone remains were analysed, 90% consisted of seals and many of these were immature (Harp 1964b). The other species present, all in very small quantities, were whale, fish, migratory waterfowl, birds, caribou, fox, beaver, and other small mammals.

Though the seal seems to occupy a position of prime importance for the Dorset economy in Newfoundland, two other faunal resources were abundant and available to coastal groups. One of these is the Atlantic salmon which comes to spawn in most major streams and rivers from June to August (Templeman, 1966:101). During this period, fish can easily be caught in great quantities and dried or stored for future use. Sites on the coast were probably occupied during the spring and summer months.

The other major food resource which would be in the range of west and northeastern coastal groups is the caribou. In historic times, there were three main herds in Newfoundland (Cameron 1958:104). The northern herd spent its summers high in the barrens of the Long Range Mountains, and wintered in the sheltered lowlands of central Newfoundland. This would be the herd most readily accessible to groups in western and northern Newfoundland, if present patterns can be assumed to have been

generally similar in the past. Coastal groups probably moved inland to intercept the animals along their migration routes in the fall and then probably followed them to their wintering grounds in the central interior. The only known inland Dorset site, the Pope's Point site on the Exploits River at its junction with Badger Brook (Devereux 1965), is located where caribou were traditionally known to cross on their southward migrations. This may represent an inland facies of a coastal group of Dorset.

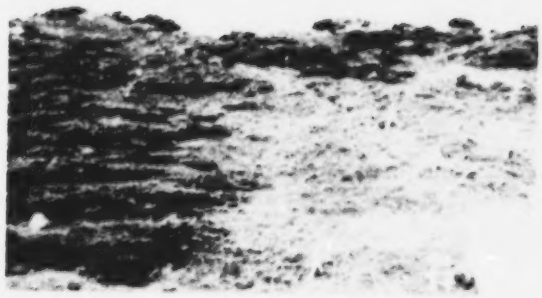
THE CAPE RAY LIGHT SITE - CdBt-1

Location and Environment

The Cape Ray Light site is located on the extreme southwestern corner of the island of Newfoundland, roughly ten miles northwest of the town of Port aux Basques (Fig. 2). It is situated in the immediate area of the lighthouse complex at the Cape and the major part of the site lies between the light and the shore.

In 1965, Helen Devereux (1966) carried out a brief examination of the site and collected a sample of artifacts from it. It became obvious, because of local interest in the site and extensive digging that had already been carried out in the richest parts of the occupation layer, that there was some urgency in the prompt excavation of the site. H.E. Devereux's investigation had shown that the site was both prolific and extensive and there was a good chance that significant information could still be retrieved from this southernmost known Dorset site.

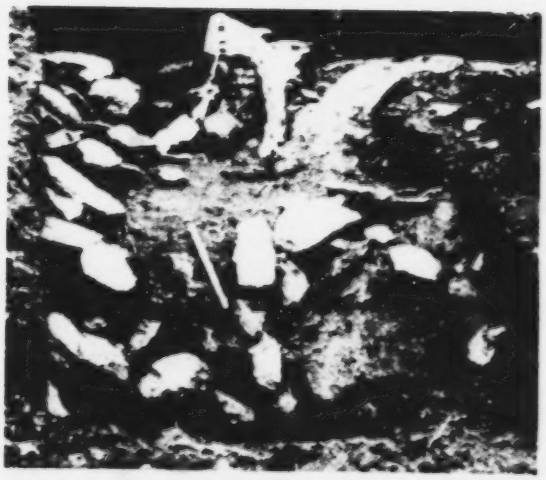
The site itself is located along a rugged and rocky shore which has sheer drops of 15 feet or more down to the water in several places (see Fig. 3a). The cultural material was concentrated on low outcroppings or mounds underlain by bedrock and surrounded by lower wet and boggy land. The site was arbitrarily divided into "Areas" which



a

b

c



d

Figure 3

were based on and more or less corresponded to these higher regions (Fig. 5). The height of these hillocks decreased progressively from Area G where it was as much as six feet, to Area A and C where the difference was barely discernable. In these lower areas, the occupation remains were located on fairly dry and well drained ground. The higher and drier areas on the site appear a darker grey on the aerial photograph, Figure 4.

The Cape is a broad headland of low relief and part of the coastal lowland which seldom attains a height of over 100 feet above sea level. The highest point at the site occurs at the light tower and is 60 feet above sea level. The coastal lowland in the area of the Cape is underlain by granitic rocks and quartz diorite of Devonian age (Twenhofel and MacClintock 1940a:1675). About five miles inland, this lowland is backed by a southerly extension of the Long Range Mountains.

The area of the Cape is treeless. Behind the site and the rock outcroppings and ridges of the coast are extensive areas of open muskeg and bog. These appear as black areas on the aerial photograph. The major vegetation elements of the occupied areas of the site are composed of a dense, low, black spruce shrub, never higher than three feet, and a form of low, trailing heather, belonging to the Ericaceae or heath family (Porsild 1964:130). This is locally known as blackberry. The marshy portions support a variety of grasses, sedges and mosses. The soil, when present, is very poor and highly acidic. Most of it consists of several organic types, including peat, raw humus and glev. The poor drainage, acidic soil and almost constant high winds off the Gulf of St. Lawrence are probably the reasons for the absence of trees and this tundra-like vegetation of southern Newfoundland.

The Cape Ray Light site is in a good position for its inhabitants

Figure 4

to take advantage of the spring gathering of harp seals on the drift ice off-shore. In the not too recent past, the Cape has formed the launching point for many seal hunts carried out by the modern-day European settlers of the region. Though no bone was preserved in the prehistoric material, seal hunting was probably the major subsistence activity carried out from the site. The launching of boats was not essential for harp seal hunting and this may also explain why the site was located along a rugged and rocky shore. This shore offers one small, sandy landing area, able to accommodate only two or three kayak-sized boats at a time. Other faunal resources that the Cape may have offered to the Dorset hunters include sea birds and fish. Local residents still erect dry-stone blinds for duck hunting and in June when the capelin (Mallotus villosus) come to shore to spawn in shallow water, schools of cod follow their prey in and may be very easily netted or caught by spearing or by hooks. The capelin themselves probably formed an important food item. These can easily be dried and kept for time of scarcity. An additional feature of the site's location was the abundant supply of driftwood that is beached along this coast. In an area where tree growth is scant, the availability of driftwood both for building material and for fuel is an added attraction for aboriginal settlement.

In summary, the Cape Ray Light site was probably a spring and summer seal hunting and fishing station. The thickness of the occupation layer and the abundance of artifacts probably means that the site was occupied repeatedly over a long period of time and reflects the abundance of food resources available there.

Excavation, Stratigraphy and Features

Initially, the surface of the site was carefully examined,

especially those areas where previous digging and disturbance had taken place. Surface artifacts were collected and designated as to the area where found. Altogether, seven areas contained cultural material and these were labelled A to G. Area A seemed to form the eastern, and Area G the western boundary of the site (Fig. 5). One or two artifacts were found in other locations, such as across the road and near the lighthouse, but no occupation layers could be located in these areas. These may have been dropped by local people who were collecting souvenirs from the site.

After testing the site areas and examining open and eroding cuts, it became clear that the major occupation of the site occurred in Areas C, E, and F. The subsequent excavations were, therefore, concentrated in these areas.

Area A is large and flat, over half of its surface covered by black spruce shrub. A number of small test pits were made, and these showed a spotty occupation layer under a surface layer of peat and raw humus. The average thickness of this occupation layer was about half an inch and the artifact yield very meager. Clearly, Area A was on the periphery of the site, and no further work was thought advisable or profitable in this area.

The only cultural evidence from Area B consisted of two artifacts found on the surface. No testing was attempted as several eroded hollows indicated that no occupation layer was present. Actually, Area B seems to be a natural extension of Area C and on the site map it has been joined to it (Fig. 5), but it does not seem to have been occupied in prehistoric times.

Area D is smaller than A or B and also more prominent above the surrounding bog. In the exposed and eroded patches in this area, a

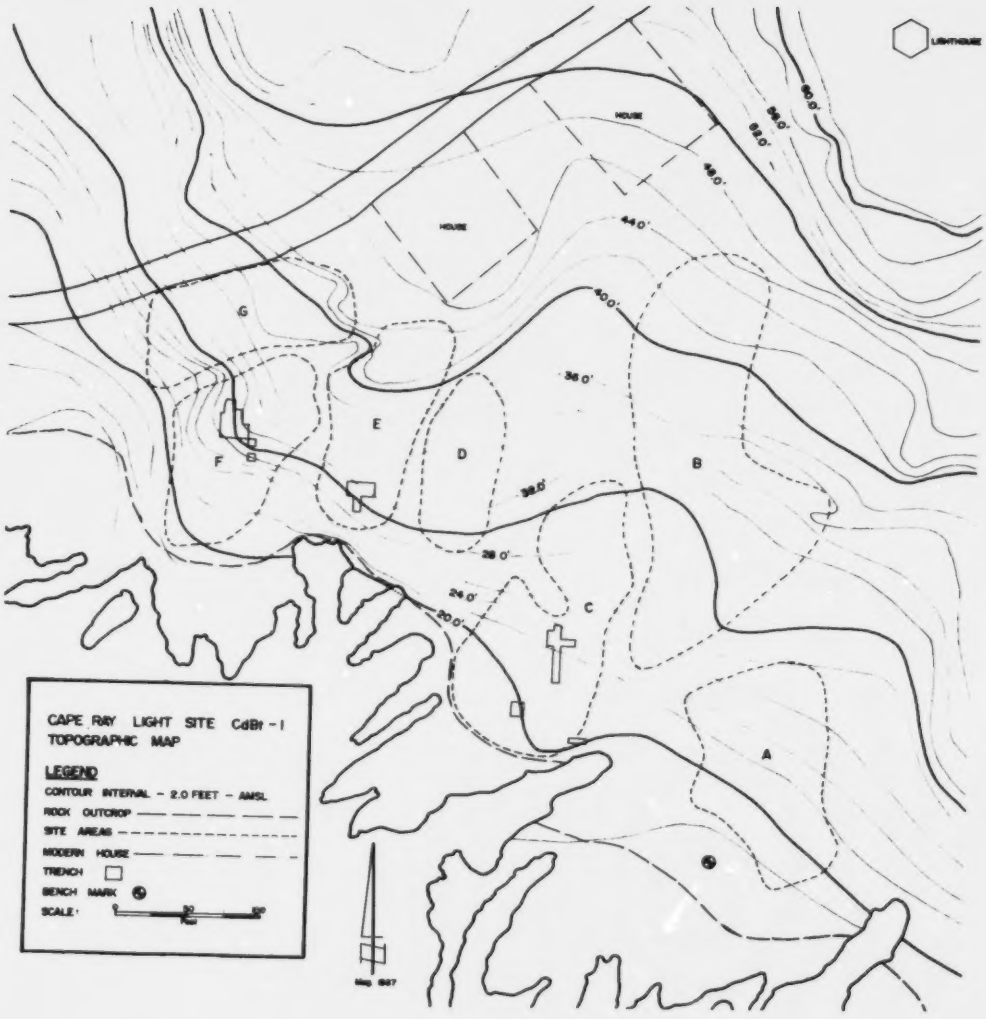

LIGHTHOUSE
HOUSE
HOUSE
90.0'
88.0'
48.0'
44.0'
40.0'
36.0'
32.0'
28.0'
24.0'
20.0'
A
B
C
D
E
F
G
CAPE RAY LIGHT SITE CdBr-1
TOPOGRAPHIC MAP
LEGEND
CONTOUR INTERVAL - 2.0 FEET - AMSL
ROCK OUTCROP
SITE AREAS
MODERN HOUSE
TRENCH
BENCH MARK
SCALE:

Figure 5

very thin occupation layer could be seen but no artifacts or other cultural debris was found in this area. This area again appeared to be on the periphery of the site and was not excavated.

Area G was also unproductive. It lies immediately adjacent to the small road leading down to the Fog Alarm building. It is separated from Area F by a sharp and deep ravine with a boggy bottom, and rises to six feet above the surrounding land. A few chert chips were found on the sloping sides of Area G, but no evidence for occupation layers could be seen. It effectively forms the western periphery of the site.

The remaining three areas of the site, C, E, and F, were excavated by a series of five- and ten-foot trenches. Area C had a total of ten trenches, Area E had four trenches and Area F had eight. The arrangement of trenches varied from place to place, but in each area, a central datum point was established and a 25 foot grid, oriented to magnetic north and south, was staked out. The grid was used as reference for placing smaller excavation units and locating artifacts and features. All the central datum points were related to the main site datum, which was that used by the Department of Transport surveyors. The department's topographic map of the lighthouse property has been used as a basis for preparing the site map (Fig. 5).

In major features, the stratigraphy was similar in Areas C, E, and F. This seems to indicate that all the areas were occupied during the same time period, or at least that occupation occurred within relatively similar positions within the same depositional sequence. Even though the occupation layers of the three areas were never physically connected by excavation, the similarity of their stratigraphy, and, of course, the similarity in artifacts found, lead to the inference that the site was occupied by the same cultural tradition over a considerable length of time.

The general stratigraphic sequence will be described here and it may be seen illustrated on any of the profile drawings and photographs (Figs. 7 and 9; 3c). Any major or significant deviations from the general plan will be discussed later under the appropriate areas.

Layer I is the immediate surface layer, arbitrarily chosen as that region which contains presently growing vegetation and raw humus. It consists mostly of a thick mass of roots and decaying vegetation and grades into the extensive peat layer, II, below it without a break. The peat of layer II is quite extensive and deep and it fluctuates around a mean of about two feet in thickness. On the whole, all areas seem to have equal amounts of this peat which was fine, compact and of reddish-brown colour. The remains of fairly thick tree branches and roots indicate that the origin of a major part of the deposit was probably from some type of forest cover at the Cape in the past. This is also the explanation suggested for peat deposits occurring above occupation layers on Dorset sites in the Port au Choix area further north along the west coast (Harp 1964a:89-90). The present surface vegetation is also dense enough, especially in areas covered by Ericaceae heath, to continue adding to the peat.

Layer III, immediately under the peat, is the occupation layer of the site. In all the excavated areas, this was a layer of very black, sooty, greasy and clayey soil. It is in this layer, which has been formed by cultural activity, that variations occur from area to area. The cultural layer was usually underlain by bare bedrock or sometimes a thin layer of reddish-beige sandy clay that rested on the bedrock and probably represented its decay. These formed the downward boundaries of the extent of the excavations.

Of the excavated and productive areas, C was both the lowest in

absolute elevation and the least distinguished in height above the surrounding bog. The occupation layer ranged between 20 and 24 feet above sea level, while areas E and F were in the range of 28 to 30 feet. The surface of Area C was fairly regular with a few exposed bedrock boulders, especially in the vicinity of trenches eight and nine. Previous digging and disturbance had occurred in an extensive area around trench one. Otherwise, the surface was covered by a dense carpet of heath or blackberry bushes. Extending north from the northern limit of excavation was an extensive area of dense spruce shrub that merged with that of Area B. Three widely spaced trenches (one, two and three) were initially excavated. Trench two seemed to be in the most promising area and the remainder of the excavations were concentrated around this trench (Fig. 6). This resulted in one long north-south trench with an expansion of about ten feet to the east off this trench.

The long north-south profile (Fig. 7) shows that this area had a gently undulating surface, a variable thickness of peat and a more or less continuous occupation layer. The occupation layer sometimes reached a thickness of more than a foot and an attempt was made to excavate in thin arbitrary layers in these deeper areas. Both because of the undulating nature of the bedrock and the variable thickness of the occupation layer, this method did not prove successful. We finally settled on merely separating artifacts from top areas of the layer from those at the bottom, whenever this was feasible. The top layer then became "a" and the bottom one "b". There were also artifacts that were from layer III only, where no arbitrary difference had been drawn. On the tables of site distribution of artifact material, the material found in the occupation layer is designated only by layer III, and not by a or b. The purpose of dividing the occupation layer in this way was, of

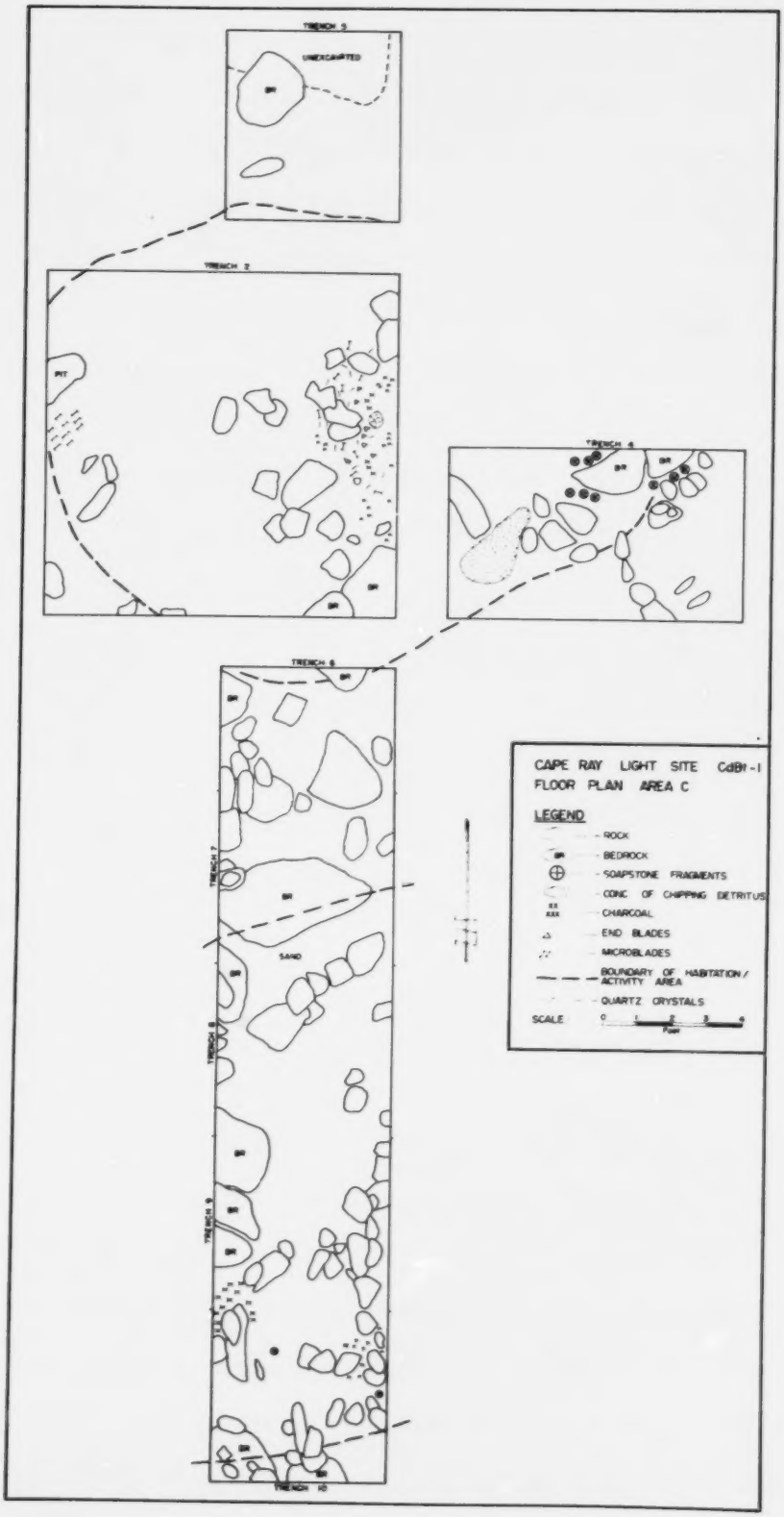

TRENCH 5
UNEXCAVATED
BR
TRENCH 2
PIT
BR
TRENCH 4
BR
BR
TRENCH 6
BR
TRENCH 7
BR
SAND
TRENCH 8
BR
TRENCH 9
BR
BR
TRENCH 10
CAPE RAY LIGHT SITE CdBr-1
FLOOR PLAN AREA C
LEGEND
ROCK
BR - BEDROCK
SOAPSTONE FRAGMENTS
CONC. OF CHIPPING DETRITUS
CHARCOAL
END BLADES
MICROBLADES
BOUNDARY OF HABITATION / ACTIVITY AREA
QUARTZ CRYSTALS
SCALE
0 1 2 3 4
Feet

Figure 6

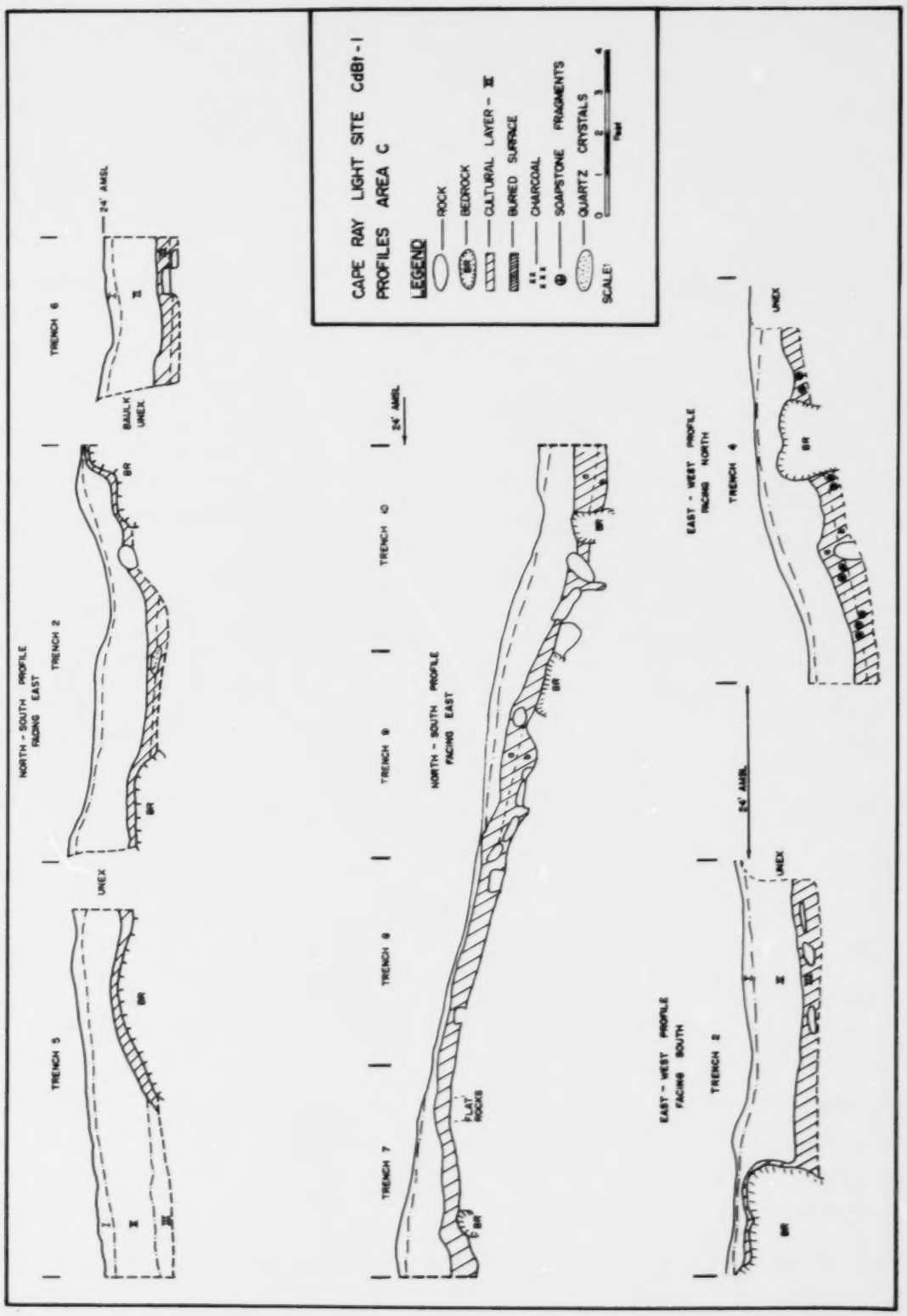

CAPE RAY LIGHT SITE CdBt-1
PROFILES AREA C
LEGEND
ROCK
BEDROCK
CULTURAL LAYER - II
BURIED SURFACE
CHARCOAL
SOAPSTONE FRAGMENTS
QUARTZ CRYSTALS
SCALE
NORTH - SOUTH PROFILE FACING EAST
TRENCH 2
TRENCH 5
TRENCH 6
TRENCH 7
TRENCH 8
TRENCH 9
TRENCH 10
EAST - WEST PROFILE FACING SOUTH
EAST - WEST PROFILE FACING NORTH
TRENCH 4
24' AMSL
UNEX
BR
FLAT ROCKS

Figure 7

course, to see if there was any variation or change in the artifacts from the earliest occupation to the latest. The artifact analysis by these layers did not indicate any difference that couldn't be explained by excavation circumstances. By this is meant that differences in frequency of one artifact type between layer a and b will have to take into account the numbers that were not separated, and designated as being within the occupation layer as a whole. A similar problem was run into in Areas E and F when trying to excavate in arbitrary layers.

The only natural stratigraphy that was present within the occupation layer of Area C consisted of thin bands of white and greyish ash. These occurred at more or less the same level, especially in trench two, and did not contain any charcoal. They are not extensive enough to represent hearths but suggest either a dump of ashes or a very short, hot brush fire. They were also sterile of artifacts and may actually be the result of natural burning.

Layer III was generally underlain by a thin sterile, beige, clayey soil that had formed from the decaying bedrock below. The acid content of this bedrock seems to be high and this, combined with the moist climate of Newfoundland, is probably the reason for the lack of preservation of organic material on the site.

The major consideration of concentrating the excavation in the area of trench two was the possibility of uncovering features that could turn out to be habitations. This possibility was suggested by stone configurations and artifact distributions in trench two. Figure 6 is a composite of the floor plans of this group of trenches. Neither during excavation in the field nor by examining the floor plans and photos could definite house outlines be established. There was certainly no feature that would suggest house pits or semi-subterranean dwellings

of the type discovered at Port au Choix-2 (Harp 1964a:22). The possibility remains that the dwellings had some type of low stone walls and perhaps a frame and skin superstructure. Evidence for such a wall was, however, not convincingly established in any of the areas excavated. Although the other areas, as well as Area C, contained great quantities of rocks and stone slabs, most of which did not form any well-defined patterns. This may indicate that if any structures or features were present, they had been dismantled by later activity and perhaps some of the material taken elsewhere.

The combination of the distribution of charcoal, certain artifact types, chipping debris and the position of concentrations of stone does result in some areas showing more evidence for habitation and living activity than others. These will be referred to as living areas. In Area C, there seem to be two such concentrations and these have been outlined by a heavy dashed line on the plan drawing (Fig. 6).

The first occurs in trenches two and four. It does not seem to extend into trench five where the occupation layer is much less prolific and terminates in a low boggy area about half-way along the trench. Also, trench six seems to be outside a heavy activity area, as it shows a dramatic decrease in artifact yield, charcoal and soapstone fragments.

This first living area is characterized by a large hearth which may have been located near its center. Around and in this hearth were end blades, microblades and quartz crystal concentrations, and east of the hearth many soapstone fragments were found, most of them representing large rectangular vessels. Two dense concentrations of chipping detritus were also found, one in the hearth area and the other, a much larger one, on the eastern side of the hearth. On the western edge of trench two was a small refuse pit, filled with ash and soil and a few

artifacts. Beside it was another concentration of microblades. The two trenches were also prolific in end scrapers, retouched flake tools and detritus. One type of activity that was carried out in this area may have been the manufacture of chipped stone artifacts. The prominence of the hearth and abundance of soapstone vessels indicates the use of this area for food preparation and perhaps for eating as well. The other artifacts suggest working of bone, wood and hide, but because of poor organic preservation, these activities can only be inferred.

The second postulated living area is even more poorly represented. It seems to begin at the big bedrock boulder in trench one and continue to the southern edge of trench ten. Since this line of trenches is only five feet wide, the east and west borders cannot be determined. The bedrock outcropping in trench nine may have been a western boundary, but if this is indeed the remains of a house, it may have held the central support for the superstructure, as whale skulls placed in the middle of Thule houses did (Mathiassen 1927:21).

The major features of interest in this living area are the two hearths. One is located by the bedrock outcropping in trenches nine and ten and the other at the eastern edge of trench ten. A wide variety of artifacts occurred in these trenches, none in any special concentrations. The hunting tool-kit is represented by end blades and side blades; butchering and hide preparation by flake knives, microblades, end scrapers and side scrapers. Trench ten also contained many soapstone fragments, including one almost complete rectangular vessel, indicating that cooking and eating may have been carried out here as well.

One feature which is difficult to interpret and explain is a large, thin patch of sand at the junction of trenches seven and eight (Fig. 6). It occurs almost at the bottom of the occupation layer, and

under a series of flat stones in trench eight. It does not seem to be a natural deposit but its function is difficult to ascertain.

In summary, Area C seems to have been heavily occupied in at least two areas probably by one or two related family groups at one time. The entire area probably could not hold more than 12 or 15 people at once.

Area E lies to the northwest of Area C and stands higher above the low boggy terrain than does Area C. The northern part of Area E did not have a substantial occupation layer and generally had a very irregular surface and dense covering of black spruce shrub. The surface in the southern part was much flatter and covered by dense growth of blackberry. There were also extensive disturbed areas in this part and it seemed that the richest parts of this area had been destroyed. Some of the excavated trenches encompassed disturbed areas (Fig. 8). However, the rich occupation layer continued into undisturbed areas and Area E became one of the more productive areas on the site.

The profiles from Area E exhibit a similar sequence of layers I, II, and III as occurred in Area C. Layer III is underlain by bedrock and a thin layer of clay, and undulates and varies in depth as much as it did in Area C. A similar lack of success was met with in attempting to excavate in arbitrary layers. There were also lenses of a hard, whitish, ash material, especially in the northern part of trench one. These were larger and more continuous than in Area C and contained some charcoal, so they could possibly have been temporary open fire areas (Fig. 9).

The distribution of hearths, artifacts and stone configurations indicates the presence of two major living concentrations in Area E (Fig. 8, 3d). One of these is on the eastern and southern parts of trench one

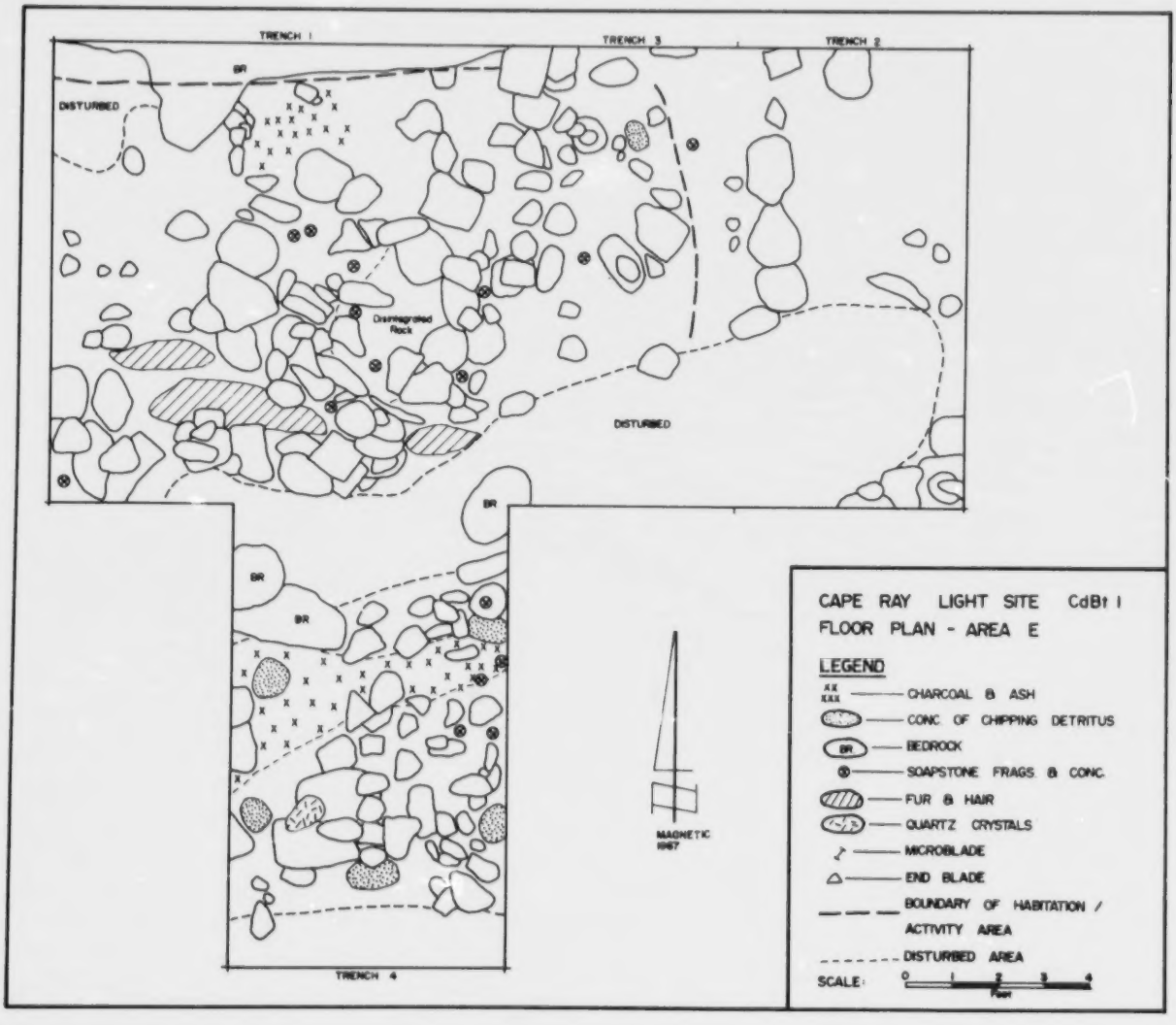

TRENCH 1
TRENCH 3
TRENCH 2
DISTURBED
BR
Disintegrated Rock
DISTURBED
BR
BR
BR
TRENCH 4
MAGNETIC
1967
CAPE RAY LIGHT SITE CdBt 1
FLOOR PLAN - AREA E
LEGEND
CHARCOAL & ASH
CONC. OF CHIPPING DETRITUS
BEDROCK
SOAPSTONE FRAGS & CONC.
FUR & HAIR
QUARTZ CRYSTALS
MICROBLADE
END BLADE
BOUNDARY OF HABITATION / ACTIVITY AREA
DISTURBED AREA
SCALE:
0 1 2 3 4
Feet

Figure 8

and extends into trench three. The second is in trench four and is separated from the first by a swath of disturbance. Both of these may have been originally joined or belonged to the same living area. For descriptive convenience, they will be described as separate areas.

The first one contains a large hearth at the northern edge and an irregular mass of stones, many of them flat, interspersed with many soapstone fragments and charred concretions and greasy soil. Where the rocks were less dense, patches of fur and hide had been preserved by the oxygen-free, damp, dense soil of the occupation layer. It is possible that this complex represents the remains of a sleeping platform in the interior of a dwelling. The precise outlines of such a postulated dwelling, however, cannot be determined from the present evidence.

The second living area in Area E presents a somewhat different situation. Here we have a large hearth, presumably at one time surrounded by stones, very closely associated with five pockets of chipping debris, containing both chert and quartz debitage. There is also a concentration of quartz crystals in this area which probably represents a stock of raw materials. In addition, a few fragments of soapstone were found, concentrated near the eastern edge of the hearth.

If the two configurations belong to the same habitation area, the interior arrangement can be summarized as follows: there were two hearths and between them a sleeping platform and a food preparation area; the larger and probably main hearth south of the platform, besides its cooking function, formed the focus for the manufacturing of chipped stone artifacts. The habitation area would have been quite large, at least 20 by 15 feet and accordingly able to accommodate eight or ten people. Area E, in its entirety, may have contained up to 15 people at one time, if the disturbed parts of it are taken into account.

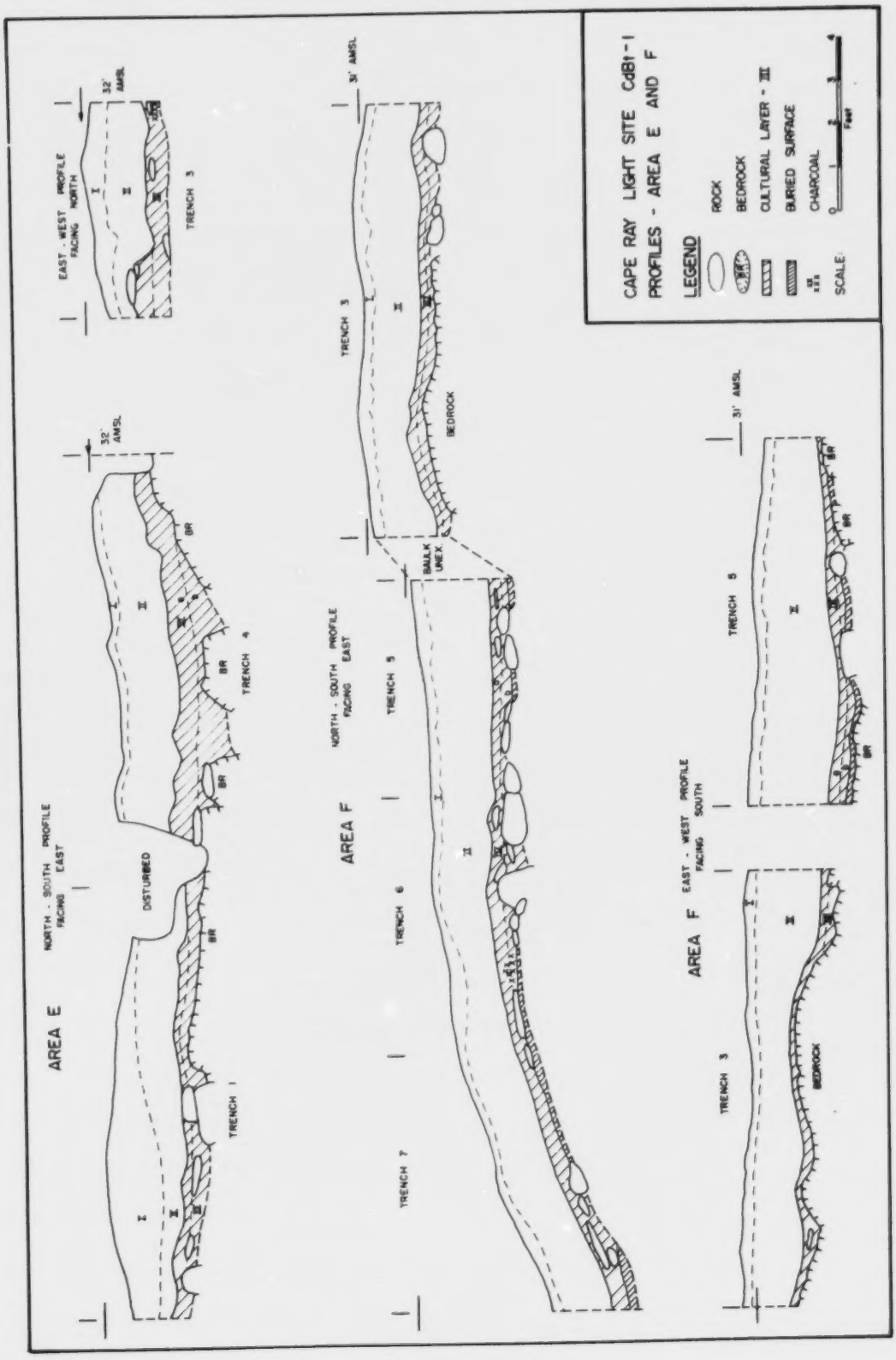

CAPE RAY LIGHT SITE CdBt-1
PROFILES - AREA E AND F
LEGEND
ROCK
BEDROCK
CULTURAL LAYER - III
BURIED SURFACE
CHARCOAL
SCALE:
AREA E
NORTH - SOUTH PROFILE FACING EAST
EAST - WEST PROFILE FACING NORTH
AREA F
NORTH - SOUTH PROFILE FACING EAST
EAST - WEST PROFILE FACING SOUTH
TRENCH 1
TRENCH 3
TRENCH 4
TRENCH 5
TRENCH 6
TRENCH 7
DISTURBED
BEDROCK
BULK UNEX
32' AMSL
31' AMSL

Figure 9

Area F (Fig. 3b), the remainder of the productive and excavated areas, rises fairly high above the surrounding low, boggy land and is separated from Areas E and G by narrow deep ravines. Again, large parts of the southern region of Area F had been disturbed and potted. The surface configurations of the area did not suggest any specific line of attack so a series of staggered trenches was initially planned. The arrangement of the trenches thus reflects the postulated locations of significant features, which in the end were sometimes not found.

Layers I and II of the stratigraphy of Area F were very similar to Areas C and E. Layer III was the occupation layer and it was very black and greasy. Some localized areas of ash and charcoal as well as solidified fur and soil concretions occurred in it, but there were no lenses of hard, whitish ash, as in Areas E and C. In many of the trenches, layer III was immediately underlain by bedrock. But in trenches five and eight, there occurred at the very base of the occupation layer a thin area of black, sticky, humus-like soil. This presumably represents the original ground cover and remains of the original surface vegetation previous to Dorset occupation. Only in area F was this surface preserved. At attempt was made to excavate in arbitrary layers in Area F, with similar results to those obtained in Areas C and E (Fig. 9).

Living areas are here much harder to outline than in the two previous areas. This is mainly due to the frequent high outcrops of bedrock thatoccur in Area F and the difficulty of judging how these were incorporated into the construction of dwellings or whether they had any cultural significance at all.

On the composite floor plan (Fig. 10), a heavy dashed line has been drawn to indicate what is presumed to be the limit of one heavily used living space. The northern limit runs along the edge of the slope

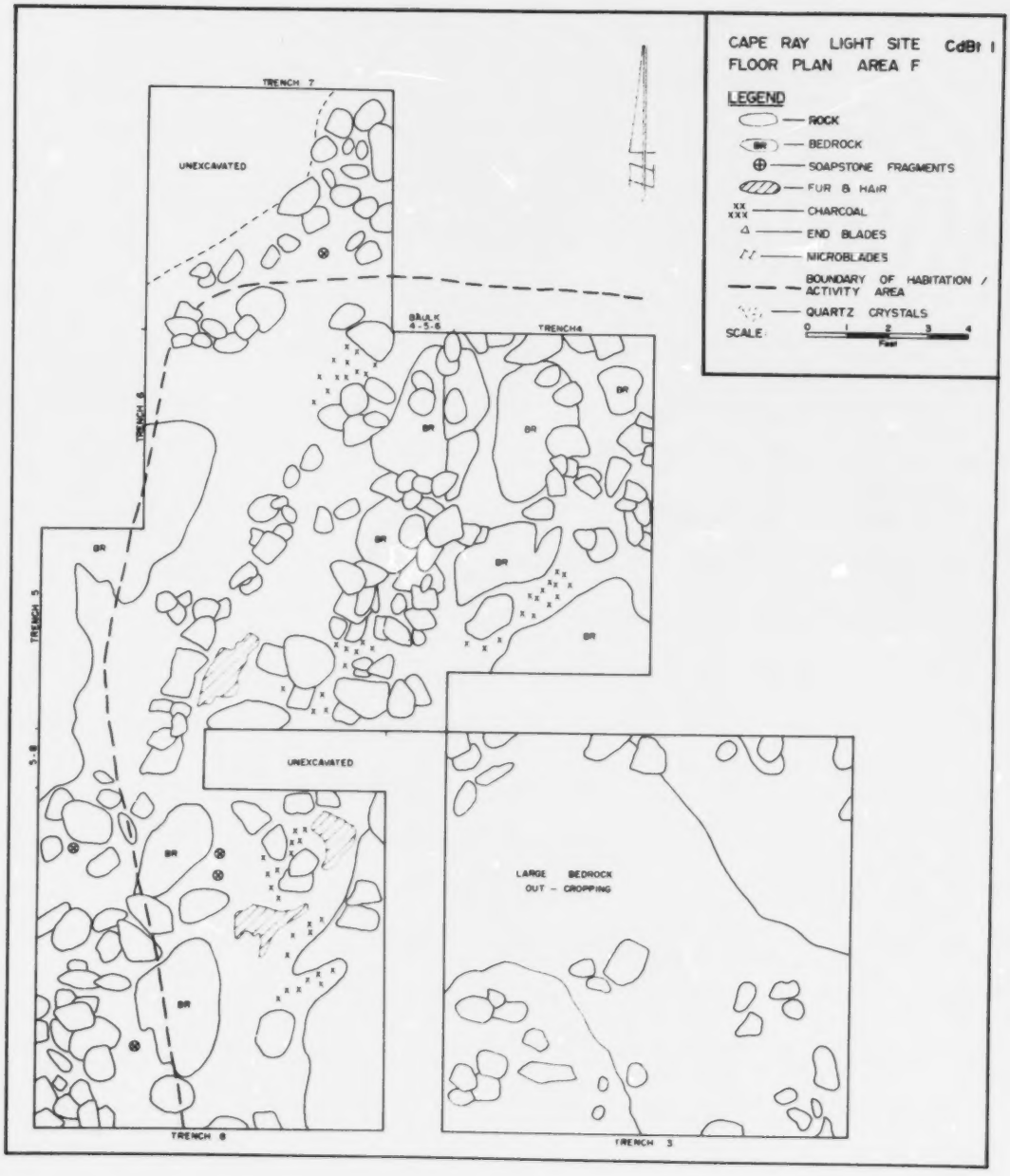

CAPE RAY LIGHT SITE CdBr 1
FLOOR PLAN AREA F
LEGEND
ROCK
BEDROCK
SOAPSTONE FRAGMENTS
FUR & HAIR
CHARCOAL
END BLADES
MICROBLADES
BOUNDARY OF HABITATION / ACTIVITY AREA
QUARTZ CRYSTALS
SCALE: 0 1 2 3 4 Feet
TRENCH 7
UNEXCAVATED
BULK 4-5-6
TRENCH 4
TRENCH 6
TRENCH 5
UNEXCAVATED
LARGE BEDROCK OUT - CROPPING
TRENCH 8
TRENCH 3
BR

Figure 10

on the side of Area F. The rocks beyond this limit have presumably slumped and slipped down from the higher area (see also profile of trench seven, Fig. 9). The western boundary may coincide with high bedrock ridge in trenches five and six and in trench eight it separates a low, damp artifact poor area from a higher and much more productive part of the trench. The southern and eastern boundaries cannot be determined from the present evidence.

The interior of this living area shows a rather complex arrangement. There is a tremendous amount of charcoal present, both generally in the occupation layer and in many hearth concentrations. Most of these hearths seemed to have been rock-lined or to have used natural bedrock features as containers for the fire. This is especially true of trench four where a heavy concentration of charcoal, with some of it in fairly large chunks, lies between two parallel ridges of bedrock. The charcoal deposits in trench eight are much more diffuse than the others, representing perhaps a series of smaller, short-term fires. Although soapstone fragments occur throughout the living area, there seem to be several concentrations in trench eight. Chipped stone artifacts are prolific with no special concentrations in any one area. There were also several small patches of preserved seal fur on the bottom of trenches five and eight. They did not seem to be associated with anything in particular. The only organic artifact, a short piece of twined string, was also found here.

The rather amorphous features leave one with the impression that this area was reused from time to time, and re-arranged slightly differently each time. The location of hearths may have been shifted, stone features disassembled and the stones used elsewhere. The absence of clear cut dwelling outlines may also be due to this shifting and

reuse of existing structures. The use of material from older houses to build new ones seems to be a common practice among historical Eskimo groups (Mathiassen 1927:21).

In general, Area F is large enough to have accommodated several family groups living in two or three dwellings.

Dating

The elevation of the site above present sea level is not useful for dating purposes as is the case in many coastal localities. The coast fronting the site rises rather steeply and the rising or lowering of sea level would not really change the distance from the site to the shore. Though the major subsistence activities were marine oriented, local topography seems more of a control for this site location. If the elevation of the site is compared to postglacial uplift isobases for Newfoundland (Andrews, McGhee and McKenzie-Pollock 1971:Table 1), the site area emerged well before 4000 years ago and could have been occupied at any time after that.

Another possible chronological aid was the peat deposit overlying the occupation layer. If the rate of accumulation of the peat could be determined, then some idea of how long ago the site was abandoned might be arrived at. Since the factors controlling peat formation are many and complex and vary from one micro-environment to another, this method also proved unsuccessful. Furthermore, there may have been quite a time lag between the abandonment of the site and the formation of the peat.

In the end, two main dating methods were used to establish the chronological position of the site. One of these was radiocarbon dating and the other was dating by artifact comparisons with those from previously dated sites. The radiocarbon dates will be presented and

discussed in this section and a brief summary of the artifact analysis and its significance will also be presented; the details of this analysis can be found in the following chapter.

Five samples were submitted for radiocarbon dating from the Cape Ray Light site. The results are given in the following table:

TABLE I

RADIOCARBON DATED SAMPLES

Location of Sample	Material	Age	Laboratory Number
Area F, trench 8	charcoal	>36,000	Gx-1273
Area F, trench 6	charcoal	2370 ± 85	Gx-1199
Area F, trench 8	seal fur	1810 ± 100	GaK-1906
Area C, trench 4	charcoal	1565 ± 95	Gx-1198
Area C, trench 1	charred fat and soil	1360 ± 90	GaK-1907

Sample Gx-1273 was reported to have no activity during the two runs that were done on it. The sample consisted of charcoal that was obtained from a hearth and the wood has been tentatively identified as some type of fir. The hearth was located in the top parts of the occupation layer and separated by at least three inches from the original surface material at the base of the occupation layer. Thus, it is unlikely that the sample was of preoccupation origin. The tremendously early date of more than 36,000 years before present cannot be explained at this time and the source for this inert carbon cannot be located. It may, however, have affected the other dates from Area F, both of which

were the earliest ones obtained for the site.

The dates from the four active samples have a maximum spread at the three sigma level of about 1400 years, from 700 B.C. to A.D. 770 and a minimum spread from 160 B.C. to A.D. 400. If the early dates are not contaminated, this indicates both a possible long-term occupation of the site as well as the presence of an extremely early Dorset component. The artifact analysis, however, does not point to such an early complex nor is there enough variation in types or in raw material to suggest a long-term occupation. The artifactual material seems to indicate a date somewhere within the minimum range, at the three sigma level, or very broadly in the first half of the first millennium A.D. The material closely resembles that from the Port au Choix sites excavated by Harp (1964a), and dated by radiocarbon to between A.D. 113 to 639 (Harp 1964b).

Summary of the Cape Ray Light Site

This is a large, productive, single component Dorset site. It was probably a favorite place for catching harp seals on the ice in the spring. As well, it is within range of spawning runs of Atlantic salmon in the Codroy River and the migrating caribou herds further inland. The thickness of the occupation layer attests to the popularity of the location, and groups probably returned here year after year.

The major occupation areas are confined to three higher and drier hillocks that rise slightly above the generally wet and boggy ground of the Cape. The stratigraphy and depositional sequences of the three areas is strikingly similar.

Each occupation area also revealed a series of features which could be combined into living and activity zones, perhaps being the remains of habitations. Area C had two such zones, Area E one or two

and Area F had one large living floor. These habitation zones were characterized by one or more hearths, an abundance of soapstone vessel fragments and remains of seal fur. Certain stone configurations and patterns suggested low stone walls and perhaps sleeping platforms. Often there was also evidence for the manufacture of stone implements within these areas. If all site areas were occupied at one time, the size of the group may have reached a maximum of 40 people.

The artifact inventory consisted entirely of stone material and seems to represent a range of hunting, domestic and manufacturing activities. There were many pieces of soapstone, representing rectangular vessels of at least three sizes as well as triangular and oval lamps. The microblade and core industry was very prolific with much ridge preparation material and core face detritus as well. Many of the microblades were retouched and others were raw ready blanks for other tools. Triangular end blades of the type hafted to the ends of bone harpoon heads, as well as a variety of side-notched end blades for spears, darts and arrows formed part of the hunting kit. Asymmetrical end blades probably functioned as knives. Burin-like tools both of chert and ground slate could have been used for the scoring and grooving of bone, wood, and hide. End scrapers formed one of the most numerous artifact classes on the site. Side scrapers with concave working edges and side blades were also present. Very large and thick end blades made of ground slate probably functioned as spear points, while small, notched ground slate end blades were used on harpoons. There were also small and large rectangular adzes of ground slate, which have been used on wood or even to scrape hides. Fragments of a very wide, broad and thin, straight-edged ground slate knife may have been used for cutting snow blocks for house building. Flake tools, both bifacial and unifacial, were plentiful.

They seemed to have been used for cutting, scraping, sawing, making holes and grooves. Large and rough stone items included hammerstones, mauls, anvils, abraders, choppers and wedges. Also, over 19,000 pieces of chert, quartz and other stone debitage were counted.

THE PITTMAN SITE - DkBe-1

Location and Environment

The site is located near the northern tip of Sop's Island at 49° 48' north latitude and 56°47' west longitude (Fig. 2). Sop's Island is a small island in White Bay, at the entrance of a small indentation along the western shore known as Sop's Arm.

The site has been known and investigated since T.G.B. Lloyd reported finding artifacts here in 1873 (Lloyd 1875). Lloyd carried out both a surface collection and an excavation of sorts, though the nature of the latter is not clear from his published reports. The site was again visited by Jenness when he surveyed the coast from the Bay of Exploits to Canada Harbour. The published results of this survey (Jenness 1929; Wintemberg 1939) do not indicate whether any actual excavation was done, but a collection from the island was described. A.H. Mallery was attracted to Sop's Island in 1948 in his quest for Viking settlements in North America. Neither from his field notes, copies of which have been obtained from the American Museum of Natural History through the kindness of Junius Bird, nor from his published description (Mallery 1951), is it clear how much excavation, if any, was carried out by his party. The artifacts he found, however, indicate that he was dealing with some type of prehistoric aboriginal site.

All of the above investigations of Sop's Island indicate that the site has at least two components, one of which belongs to the Dorset

culture and the other to an Archaic culture as defined initially by Harp (1963) and more recently by MacLeod (1967) and Tuck (1971b).

The Pittman site borders a small, sheltered cove on the eastern shore of Sop's Island, almost at its northern extremity (Fig. 11). It extends from a high and relatively flat bench, down along a gentle and grassy slope to the high water mark at the shore (Fig. 12a). This area is sheltered on the north and south by two high, almost barren, rocky hills. Till and colluvium deposits in this low-lying area appeared to be quite thick and a good layer of topsoil has developed. The basic soil type and natural profile were of the podzolic variety. Because of this soil layer, good drainage and shelter from winds, a substantial tree growth was present in most non-cultivated areas. The type of forest may be characterized as boreal coniferous with balsam fir and white spruce as the dominant elements and with occasional deciduous trees such as poplar and red maple. All of the site area has been under cultivation at one time or another, mainly for the purpose of growing potatoes and hay. Today, there are two potato gardens in use and the rest of the cleared land produces a rich cover of grass used to feed stock (Fig. 13). The top 12 inches of the site have, therefore, been disturbed.

About a one-quarter mile away, bordering another small, sandy cove, this time on the northern tip of the island, is another site area; designated as DkBe-2 (Fig. 11). Here at the base of the talus slope of the northern prominence of the island were found several isolated areas of chert and quartz chipping debris and two Dorset artifacts (Fig. 20, a and b). These were underneath a thin layer of sparse vegetation and peat. One of these was located near a small hearth. They seem to represent temporary stopping places, perhaps for the purpose of

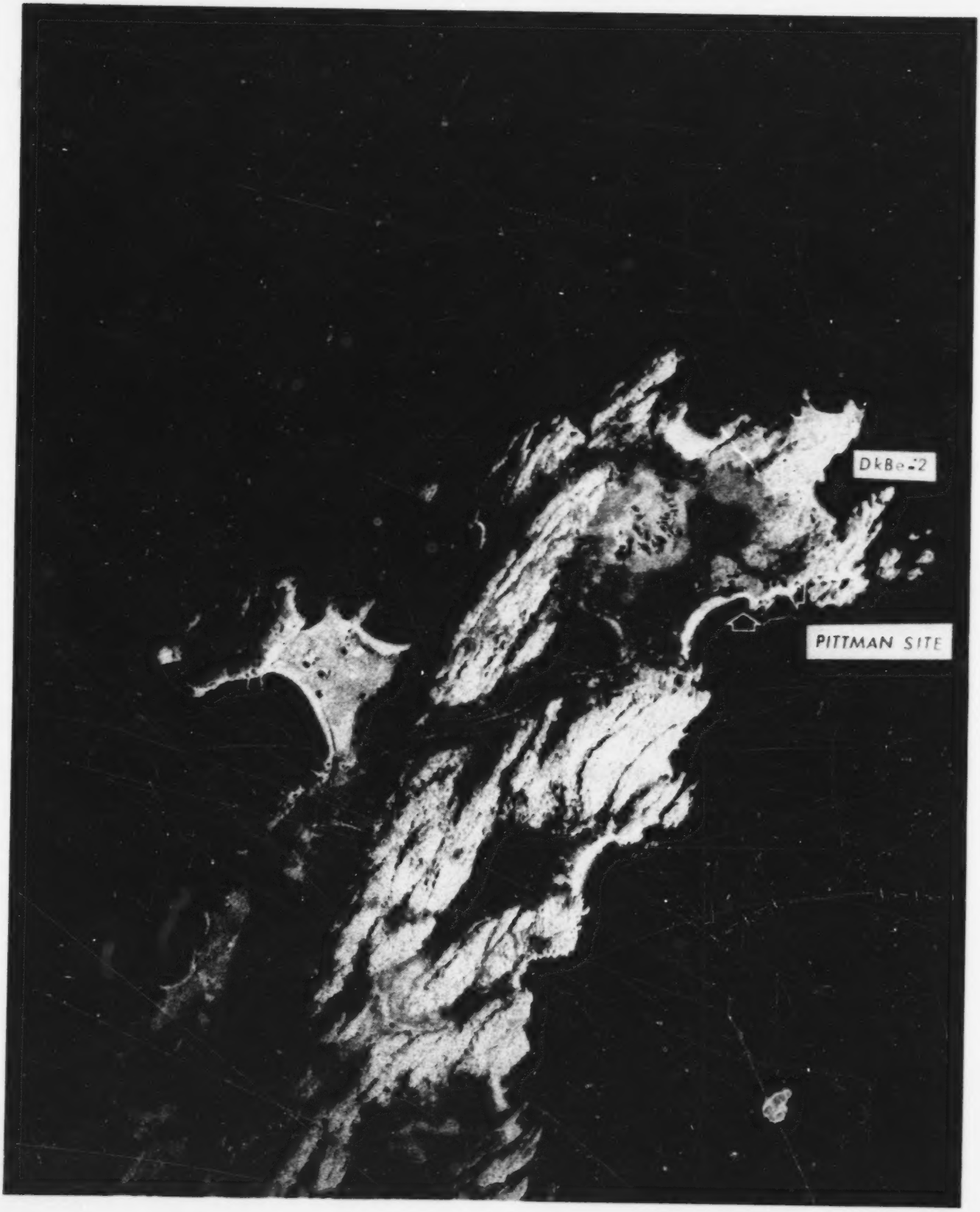
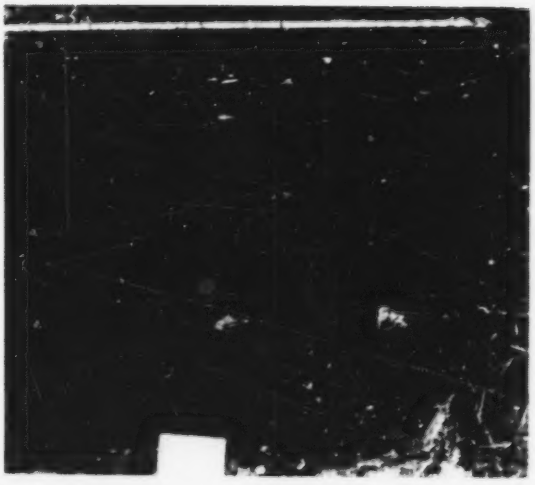


Figure 11

a

b



c

d

Figure 12

keeping a watch for sea mammal activity up the bay. Farther up the talus slope was a considerable amount of dolomitic flaking debris, buried in a slightly darker layer within the talus. The Archaic people on the Pittman site used this material for manufacturing stone artifacts, and it appears that they may have obtained the raw material from this talus slope. The main aboriginal settlement on the island was at the Pittman site, DkBe-1.

For prehistoric hunters, Sop's Island lies within easy exploitation range of three major food resources--seal, caribou and fish. By March, the whelping herds of harp seals begin to appear on the ice of White Bay. The northern promontory of Sop's Island has been used by Newfoundland sealers to keep a look-out for seals, and the sheltered coves of the island have been the traditional launching places for seal hunters. Seals during this season appear on the ice in thousands, and enough may be caught during the two or three week season to provide food for many months. Probably both the Dorset and Archaic peoples selected the site for this reason. The spawning runs of the Atlantic salmon in the Main River, which empties into Sop's Arm just a couple of miles away, could also be exploited from this site. Fishing at the mouth of the Main probably formed a major part of the subsistence activity for the summer months. The site is also fairly close to one of the main migration routes of the caribou. The herds that had been spending the summer on the high barrens of the Northern Peninsula began to move south in the fall. They followed the lowlands between the mountains and the shore of White Bay, possibly crossing the Main River in the vicinity of Sop's Arm (Cameron 1958:105).

The area of Sop's Arm, then, offers abundant food resources from March until October, and the Pittman site could have been occupied during some or all of that time.

Excavation and Stratigraphy

The site was first visited by the author as part of Helen Devereux's survey party in the summer of 1966. During that brief visit, all exposed ground areas were examined and test pits were dug. Both of the cultivated potato gardens were prolific in artifacts and an eroding bank by the shore, designated as Area J (Fig. 13), revealed a dark, thick occupation layer that seemed to be undisturbed. The results of the preliminary survey indicated that almost all other site area had been disturbed by cultivation. It also became clear that the two components, the Dorset and Archaic, were located in separate but overlapping areas on the site. The Archaic material, most of which was made from dark grey dolomite, tended to be concentrated on top of the high bench north of the northern half of garden one. Only in test trench C1 was this component found to be undisturbed. Dorset material, made mostly from chert and quartz, was located on the slope of this bench and extended down to the high water mark in Area J. A thin layer of occupation belonging to the Dorset component overlay the Archaic layers in Trench C1. It also became evident that the only remaining part of the site to be undisturbed was that in Area J, and it was decided to concentrate excavations in that area the following summer. Also, in the testing of Area J, two dark strata containing Dorset artifacts and separated by a thick peat layer were found, indicating that the Dorset component was stratified.

The plan of excavation was to cut a profile along the eroding bank and then to proceed by series of staggered trenches north and south of this profile. Trenches one to six were part of this operation. In addition, two trenches, seven and eight, were excavated further up the bank to determine the extent of the occupation layers (Figs. 12b and 13).

As a result, two different stratigraphic sequences were established

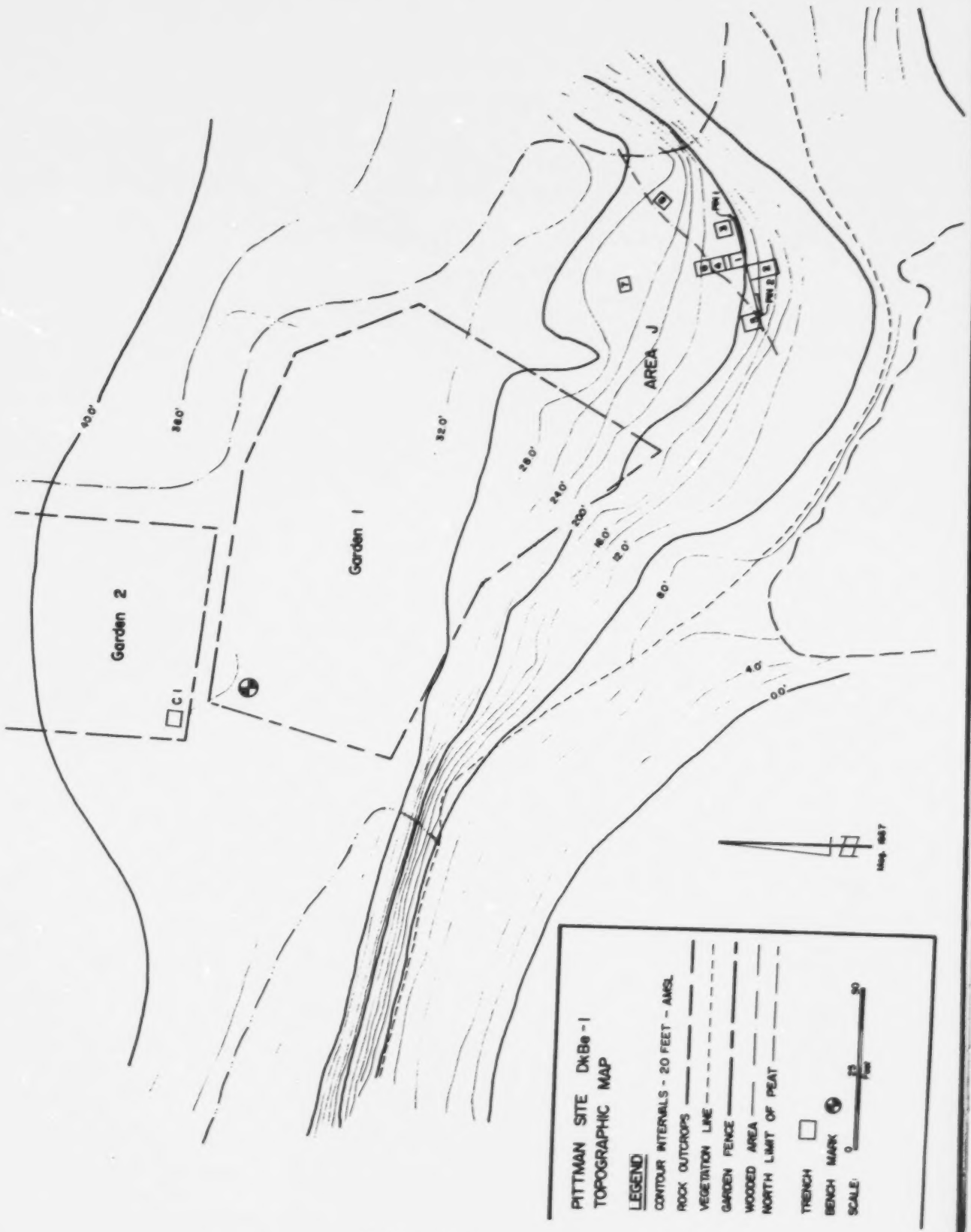

PITTMAN SITE DkBe-1
TOPOGRAPHIC MAP
LEGEND
CONTOUR INTERVALS - 20 FEET - AMSL
ROCK OUTCROPS
VEGETATION LINE
GARDEN FENCE
WOODED AREA
NORTH LIMIT OF PEAT
TRENCH
BENCH MARK
SCALE:
Garden 1
Garden 2
AREA J
C1
PIN 1
PIN 2
40'
36'
32'
28'
24'
20'
16'
12'
8'
4'
00'

Figure 13

in Area J. The first of these is derived from the trench complex from the eroding bank and is shown in the two long east-west and north-south profiles on figure 14 and the second is shown by the profile of trench seven on the same drawing.

The sequence by the eroding bank (Fig. 12c) begins with layer I, which is the surface sod layer. It is basically a zone of thick, matted grass roots and dark topsoil. Below this is layer II, also consisting of topsoil but having a much sparser root content. Layer II is quite thick in places, reaching 12 to 14 inches below the surface. It contained a mixture of Dorset, Archaic, and European artifacts and is the zone of cultivation. Several V-shaped projections at the base of this layer into the peat below are probably the remains of old, deep furrows.

Layer III is a deposit of peat that lies between the top disturbed layers and the occupation layer IV, in all trenches by the shore except trench six. The dashed line on the site map indicates the extent of the peat layer. It is today confined to the lower edge of a sloping meadow that was once a cultivated garden. Layer III also contained two different kinds of peat. In the area around the east-west profile, the top part of the layer was characterized by fine, darkish-brown material. The lower part of the peat deposit was much more woody, full of tree branches and trunks measuring five or six inches in diameter. It was reddish-brown and lacked artifacts and gravel. It seems as if the top part of the peat layer has been disturbed and mixed with soil and artifacts while the lower parts are undisturbed.

In most of the trenches, the woody peat is underlain by a layer of fine whitish sand. At the bottom end of trench two, this deposit is quite extensive and merges with the present beach sand. It was culturally sterile. Flotation was carried out on it, but nothing of any

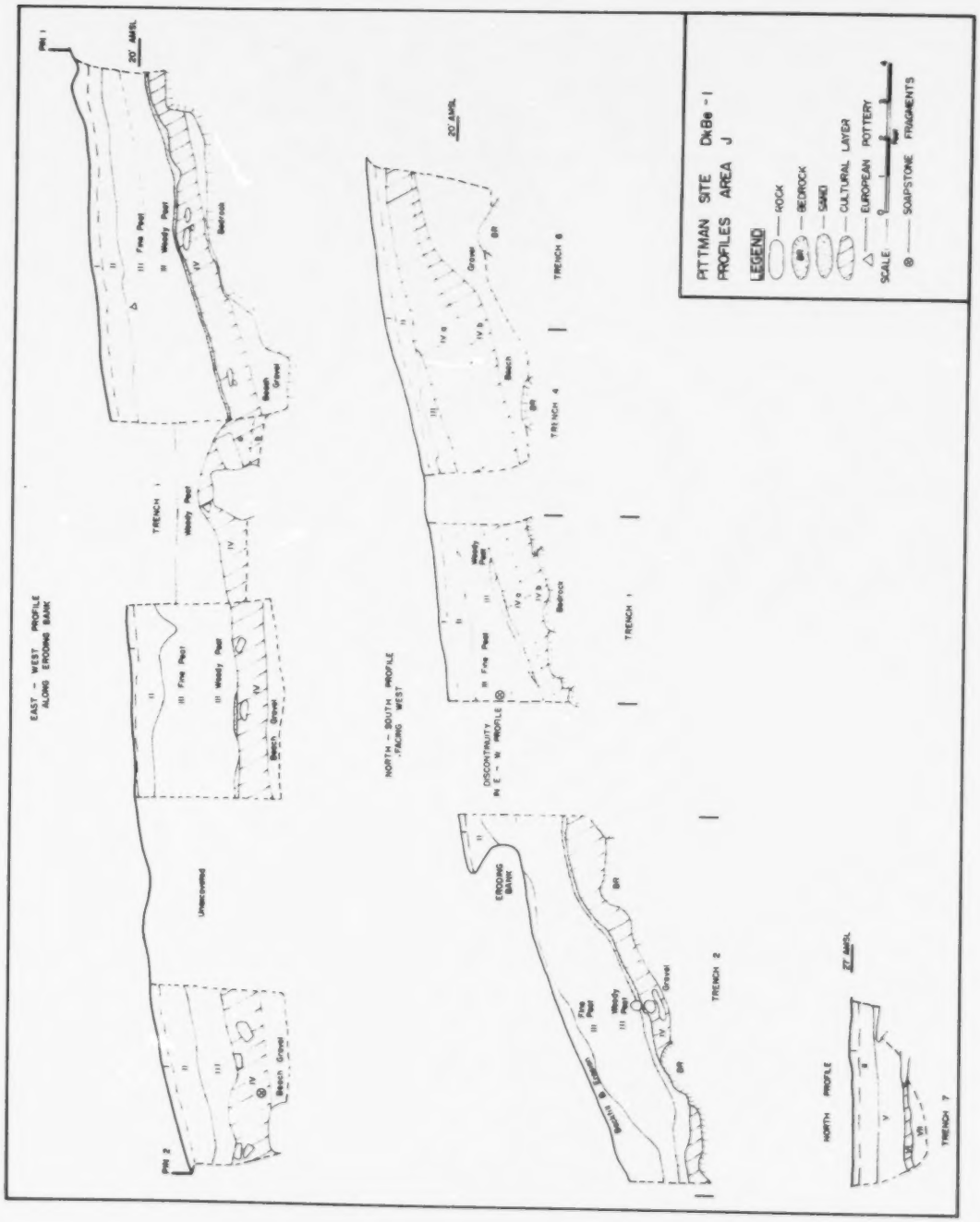

PITTMAN SITE DkBe-1
PROFILES AREA J
LEGEND
ROCK
BEDROCK
SAND
CULTURAL LAYER
EUROPEAN POTTERY
SCALE
SOAPSTONE FRAGMENTS
EAST - WEST PROFILE ALONG ERODING BANK
NORTH - SOUTH PROFILE FACING WEST
DISCONTINUITY IN E - W PROFILE
NORTH PROFILE
TRENCH 1
TRENCH 2
TRENCH 4
TRENCH 6
TRENCH 7
Fine Peat
Woody Peat
Beach Gravel
Bedrock
Undisturbed
ERODING BANK

Figure 14

significance was separated, nor were any micro-faunal remains noticed under microscopic examination. Thus, it could not be determined whether the sand was of salt or fresh water origin. All of the above deposits, the fine peat, the woody peat and the sand, were designated as layer III.

Layer IV is the undisturbed Dorset occupation layer in Area J. It occurred in all trenches except trench seven. It varied quite a bit in thickness but was generally substantial and rich in artifacts. An attempt was made to excavate in arbitrary units, but as at the Cape Ray Light site, this proved unsatisfactory. The best that could be done was to keep top parts of the layer separate from bottom parts. When this was done, the top was designated as "a" and the bottom as "b". When this was not done, artifacts were designated merely as coming from layer IV. In the artifact distribution tables, only IV has been used for the occupation layer.

In general, the top areas of the occupation layer contained more artifacts and more charcoal, were darker in colour and contained much less beach gravel and pebbles. Artifacts occurred in the lower levels right down to bedrock, but were less common. The lower levels also were rich in beach gravel, sometimes with a bit of soil mixed in. In some cases, these lower occupation levels did grade into almost pure gravel and sand that was presumably the old pre-occupation beach. In most trenches, the occupation layer rested directly on bedrock which was rather jagged and irregular and probably fairly uncomfortable to camp on.

This stratigraphic sequence seems to present the following sequence of events. The Dorset occupation started on a rather gravelly and rocky beach with something of a slope. The thickness of the occupation layer that built up indicates that the site was re-occupied for many years. When occupation terminated, a thin deposit of sand was

laid down, possibly by water running down the slope or by high seas washing against the slope. Some time later, heavy vegetation with trees grew over the area and these eventually died and decayed to produce the woody peat deposit. The next major event at the site was the arrival of the European cultivators. To extend their garden areas, they removed the peat deposit up the slope and re-deposited it further down. This seems to be the origin of the fine, disturbed peat. In the process, they also exposed the occupation layer in the higher areas. This, they discovered, was rich, fertile material and parts of this layer were also spread down the slope to cover the re-deposited peat. Thus was formed layer II in the lower parts of the site. The profiles of trench six and four have evidence for such a sequence of events (Fig. 14). Here layer II rests directly on the occupation layer with no peat between them. The peat begins as a narrow wedge near the bottom of trench four and broadens out markedly in trench one. Also, an old resident of Sop's Island remembers that when he was a boy, this type of gardening activity was carried out on this slope.

The cultural stratigraphy that seems to be present in most trenches, with one artifact horizon, layer II, separated from an occupation layer, IV, by a peat deposit, is really artificial and a result of later modification of the site by European cultivation.

The second major stratigraphic sequence uncovered by excavation in Area J appeared in the small test trench seven. Basically, it is an extension of the sequence further down the slope. Here, layers I and II are similar to those from the other trenches and represent an occupation layer disturbed by cultivation. The majority of the artifacts in these layers belonged to the Dorset component. Layers III and IV were not present, but rather layer II is underlain by a hard-packed,

gravelly soil, brownish-beige in colour. This is layer V and it is sterile. This may represent colluvium deposited from further up the slope. Under this, is layer VI a dark, organic band that may represent an old buried surface. Two artifacts were found in this layer (Fig. 34, d and c) and these appear to belong to the Archaic component. This may indicate a stratification of the Dorset component above the Archaic component that was first noticed in trench C1 in garden two.

The undisturbed occupation layer in Area J contained lots of scattered charcoal and many small concentrations. Only two of these were extensive enough to be hearths. One of these occurred in trench one and consisted of a patch of charcoal and ash measuring 18 inches in diameter and up to two inches in thickness. Only a couple of rocks were associated with it. The other hearth occurred in trench eight. Again, it was merely a deposit of charcoal and ash, with no accompanying stone features. Nearby, in the same trench, were a few scraps of partially burnt bones. They were the only organic material preserved on the site. They have tentatively been identified as seal bones. The fragments were really too small for positive identification. No other features were uncovered in Area J.

Dating

The elevation of the cultural horizon in Area J is 13 feet above sea level at a minimum. When this figure is compared to post-glacial uplift isobases for Newfoundland (Andrews, McGhee and McKenzie-Pollock 1972, Table I), it seems that this land has emerged between 4000 and 3200 years before present and could have been occupied at any time after that. Coastal emergence does not furnish a more specific date than this for the occupation.

The rate of peat accumulation was also not very informative because of the lack of knowledge of rates of formation under these kinds of conditions. A peat sample, from close to the bottom of the layer, was dated by the radiocarbon method. This produced an age of 990 ± 100 (GaK-1905). At a three sigma range, this date overlaps somewhat the latest date from the occupation layer. It appears that the peat started to form very soon after the abandonment of the site.

Two charcoal samples from layer IV were also submitted for radiocarbon dating. One came from the hearth in trench one and the other from the hearth in trench eight. The one from trench one returned an age of 2780 ± 100 (GaK-1903) or 830 B.C. ± 100, and the one from trench eight gave an age of 1340 ± 100 B.P. or a date of A.D. 610 ± 100 (GaK-1904). Even at the three sigma level, these two dates are at least 800 years apart and could be 2000 years apart. This suggests a very long period of occupation, though not necessarily continuous, for the Dorset component in Area J of the site. It also suggests that the occupation commenced during very early Dorset times. Radiocarbon dates from the Arctic indicate that Dorset culture originated around 800 B.C. (Taylor, 1968b). Such an early complex could not be isolated from the artifact inventory though a couple of items, one burin, with ground facets and some side blades may indicate early affinities. These items are not enough to be considered as a complex, but this may be due to the lack of good time markers in Dorset stone industry in general. The overwhelming majority of artifactual material favours the later part of the range of dates, or the first half of the first millennium A.D. The material corresponds very strongly with the west coast sites of Harp, and especially the Port au Choix series, for which the range of dates is from A.D. 113 to 639 (Harp 1964b).

The Archaic component has not been dated by radiocarbon methods. Only one artifact of diagnostic value was recovered during the 1967 season. This is a large, stemmed ground slate point (Fig. 30, k). Points of this type have been reported from the Maritime Archaic Twillingate site (MacLeod 1967) and from the Port au Choix Archaic cemetery (Tuck 1971b). During the 1966 preliminary survey, several ground stone celts and gouges resembling those of the Maritime Archaic were also found. The author had been able to examine these through the kind permission of Helen Devereux. At present, the range of dates for the Maritime Archaic in Newfoundland is from 4920 to 3200 radiocarbon years before the present (Tuck 1971b). At this time, the Archaic component cannot be dated beyond indicating this wide range for the material.

Summary of the Pittman Site

The site is favourably located in relation to the herds of harp seals that come down White Bay on the drift ice in the spring, to the spawning runs of Atlantic salmon in the Main River, and to migratory caribou herds along the flanks of the Long Range Mountains. These may be reasons for the presence of two prehistoric occupations of the site - the Archaic and the Dorset, the latter of which appears to have endured for a considerable length of time.

Not much is left of the Archaic component, but it seems to have been located on the higher areas of the site. It is under the Dorset component in stratigraphic position, and the few diagnostic artifacts indicate strong affinities to the Maritime Archaic, Hence, it may be dated to somewhere during the second millennium B.C.

The Dorset component is concentrated on the lower slopes and down by the shore where parts of the occupation layer are undisturbed and

capped by a substantial layer of peat. This component was very prolific in stone artifacts, but no bone or wood was preserved. The artifact inventory included soapstone that had been worked into rectangular vessels of different sizes and into rounded lamps. The microblade and core industry was also strongly represented by the blades and cores themselves as well as core ridge preparation flakes and core face detritus. Both retouched and unretouched microblades were found. Several varieties of end blades were present. The majority of these were triangular and probably hafted to the ends of bone harpoon heads, spears and arrows. Some were also side-notched. A category of asymmetric end blades was probably used as end-hafted knives. Several ground, burin-like tools may have been end-hafted and used for the incising and grooving of bone and wood. End scrapers were also quite numerous with some variety in their shapes. Some were triangular, others asymmetrical and still others stemmed and notched. A few side scrapers with a concave working edge and a few side blades were present. These may both have been hafted to the sides of bone or wood handles. There was a wide variety of flake tools, both bifacial and unifacial, that seemed to function as knives, saws, scrapers, perforators and gravers. Some of these were very minimally retouched with no form alteration. The rough stone category consisted of two sandstone abraders and two quartzite choppers. And finally, close to 6000 pieces of stone detritus and rejectage were counted. These consisted of chert, quartz and dolomite material.

This range of artifact material represents both hunting activity, domestic tasks such as cooking and the manufacturing of bone, wood, and hide items. The Dorset part of this site, then, was a substantial settlement occupied by a group of men, women and children who carried out the full range of living activity here. Since very little of the

occupation area of the site remains, an estimate of the size of such a group cannot be made.

Dorset Culture

INTRODUCTION

The Cape Ray Light site and the Pittman site are two of the larger Dorset sites that have been excavated in Newfoundland. Most of the lithic artifact types that have been found at other Dorset sites on the island, as well as in the Arctic, are found here. Radiocarbon dates from these two sites, in conjunction with other dates from the island, can be used in trying to establish the chronological position of Dorset in Newfoundland. In addition, settlement and subsistence data from these sites can be used in reconstructing the nature of Dorset adaptations in Newfoundland.

This section will first deal with the chronological position of the Newfoundland Dorset sites, followed by an analysis of the lithic technology of Dorset culture. Then a detailed outline of the lithic technology of Dorset as it is found in Newfoundland will be presented and compared to the total Dorset complex. A similar comparison will also be carried out with habitation remains, settlement patterns and ecological adaptations.

These outlines and comparisons will form the basis for a summary defining the Newfoundland aspect of Dorset culture. An attempt will be made to discuss and explain the distinctive nature of the culture in Newfoundland, both with regard to its affinities with the parent Arctic form and to its evolution and change in Newfoundland as a result of environmental factors, geographic isolation and climatic change.

CHRONOLOGICAL POSITION OF NEWFOUNDLAND DORSET

Non-chronometric Dating

The only non-chronometric dating attempted was by comparison of artifact classes between the Newfoundland sites and Arctic sites. Table Two lists artifact classes and attributes from Arctic sites that appear to have significance in time. The sites used in preparing this table are those that have been either chronometrically dated or dated by the presence of time sensitive artifacts, especially harpoon head types. These sites have also been grouped into three arbitrarily defined periods--early, middle, and late--and an attempt has been made to arrange sites in a relative order within these periods. The early period is taken to extend from 800 B.C. to 300 B.C., the middle from 300 B.C. to A.D. 500 and the late period from A.D. 500 to A.D. 1300.

Artifact classes and attributes in Table Two have been arranged in sequence to produce an ordered matrix. In this case the matrix has been ordered around the diagonal, proceeding downward from early to late. The order of the listed traits, then, also represents their relative position in time, with the earliest traits at the top. Since the size of samples is so variable from site to site this order may be far from accurate, but it should indicate general trends of artifact change through time in the Arctic sites. An important feature of this arrangement is the paucity of traits that are confined to any single period. The majority of the traits occur either in both early and middle periods or both middle and late periods. The middle period, therefore, forms a transition between the other two. This, combined with the fact that very few traits are period specific, makes it extremely difficult to separate possibly mixed components by artifact seriation. For example, the

TABLE 2

TIME VARIABLE ARCTIC DORSET LITHIC CLASSES AND ATTRIBUTES

	Early					Middle										Late					
	Igloolik I & II*	Tyara*	T1*	Lake Harbour	Hamilton Inlet*	Igloolik III*	Saglek*	Joss*	Wellington Bay*	Cambridge Bay	Bernard Harbour	Walrus Island	T3*	Sea Horse Gully*	Sermermiut*	Abverdjar	Crystal II	Igkookik IV & V*	M2	T2	Dundas Island	Mill Island	Invarfiqssuaq
Burin, unground		X	X	X																			
Ground slate, multiple notched end blade	X	X																					
Burin, ground				X																			
Polyhedral core, conical		X																					
Ground slate, semi-lunate knife		X																					
Side-notched end blade, multiple	X	X	X								X												
Ground slate, notched graver	X	X						X				X											
Hammerstone, maul		X		X							X												
Ground and chipped slate adze			X	X				X															
Ground slate, triangular end blade				X				X			X												
Side blade, rectanguloid			X									X	X										
Side blade, bipointed			X		X							X											
Tip fluting on end blades	X	X	X				X	X		X	X	X											
Side blade, ovoid		X	X		X			X				X											
Polyhedral core, rectangular-triangular		X	X		X			X	X		X				X								
Triangular end blade with straight base	X	X	X	X				X			X	X	X				X						
Side-notched end blade; single, small notch	X	X	X	X	X	?	X	X	X	X		X			X		X	X					
Soapstone, rectangular vessel	X	X												X	X								
End scraper, end-of-blade		X										X					X	X					
Side blade, semi-lunate								X			X	X											
Polyhedral core, ridged platform															X								
Quartz crystal "chisel"														X	X							X	
Burin-like tool, triangular					X			X				X			X		X	X				X	
Soapstone, rounded vessel				X		X		X							X	X		X	X			X	
End blade, stemmed					X			X							X	X	X		X		X	X	X
Triangular end blade with broad concave base						X										X	X			X	X	X	X
Ground slate, stemmed end blade																X						X	
Ground slate ulo blade																						X	

*Radiocarbon dated

presence of one or two traits that are early period indicators, may mean that an early component is present, but since the majority of the traits may be equally represented during both the early and the middle period, it would be difficult to separate these two components.

Table Three indicates the distribution of the time variable Arctic traits as they occur on major Newfoundland sites. This comparison points out several things. First, that the Newfoundland sites were occupied for a considerable length of time, perhaps from the latter part of the early period until the late period. Second, that the majority of the Newfoundland traits are found on middle period sites in the Arctic but most are not confined to this period. Many of these traits also occur on early sites and many others have been found on late sites. It seems that we are dealing with a lengthy continuum of occupation of Newfoundland Dorset sites. The heaviest occupation appears to have taken place during the middle period; at least, this period is best represented in the lithic inventories.

Chronometric Dating

At present there are three sets of radiocarbon dates available from Dorset sites in Newfoundland. The longest series of dates are those run by Harp from the large, west coast site of Port au Choix-2, where a total of 20 samples were dated by the University of Pennsylvania (Stuckenrath, Coe and Ralph 1966; Wilmeth 1969). These dates were taken on two types of material, one on charred fat and sand and the other on charcoal. The charred fat and sand dates were significantly earlier than the charcoal dates. Taking into consideration the strong clustering of the charcoal dates and the possibility that the charred fat and sand samples were not all associated with the Dorset occupation, Harp

TABLE 3

OCCURRENCE OF TIME VARIABLE DORSET LITHIC CLASSES IN NEWFOUNDLAND

	Early Dorset	Middle Dorset	Late Dorset	Pittman	Cape Ray Light	Port au Choix	Upper Black; Eastern Point; Woodworth
Burin, unground	X						
Ground slate, multiple notched end blade	X						
Burin, ground	X			X			
Polyhedral core, conical	X				X	X	X
Ground slate, semi-lunate knife	X						
Side-notched end blade, multiple	X			X	X	X	
Ground slate, notched graver	X	X			X	X	
Hammerstone, maul	X	X			X	X	
Ground and chipped slate adze	X	X					
Ground slate, triangular end blade	X	X		X	X		X
Side blade, rectanguloid	X	X			X		X
Side blade, bipointed	X	X		X		X	X
Tip fluting on end blades	X	X		X	X	X	X
Side blade, ovoid	X	X					X
Polyhedral core, rectangular-triangular	X	X		X	X	X	X
Triangular end blade with straight base	X	X		X	X	X	X
Side-notched end blade, single, small notch	X	X		X	X	X	X
Soapstone, rectangular vessel	X	X		X	X	X	X
End scraper, end-of-blade	X	X	X	X	X	X	
Side blade, semi-lunate		X				X	X
Polyhedral core, ridged platform		X		X	X		
Quartz crystal "chisel"		X	X	X	X	X	
Burin-like tool, triangular		X	X	X		X	X
Soapstone, rounded vessel		X	X	X		X	
End blade, stemmed		X	X		X?		X
Triangular end blade with broad concave base		X	X	X	X	X	
Ground slate, stemmed end blade			X				X
Ground slate, ulo blade			X				

has accepted the charcoal samples as dating the Dorset occupation of Port au Choix-2, but was unable to offer an explanation for the aberrant early charred fat and sand dates (Harp 1964b:4; 1968:43). The charcoal dates average A.D. 370 ± 13 and cover a period of 415 years from A.D. 214-629 while the charred fat and sand dates average 6 ± 21 B.C. and range from 344 B.C. to A.D. 133 (Wilmeth 1969:119). Sea mammal fat may contain an abnormally high proportion of older carbon, picked up by the animal while feeding on marine food materials. This may explain the almost 400 year difference between the two series of dates. Another explanation may be that two separate cultural components are present on the site. Neither the stratigraphy of the site nor artifact seriation have supported this conclusion, and "all samples are believed to represent one general occupation phase" (Wilmeth 1969:119). The charcoal dates, which Harp feels are more acceptable, indicate a spread of 526 years between limits of standard deviations. Concerning this possible lengthy period of occupation, Harp has stated "We have not succeeded in defining any important seriated change within this continuum" and that "One sees, rather an extended primitive Eskimo provincialism" (Harp 1968:43-44). Before obtaining the radiocarbon dates he had estimated that Newfoundland Dorset dated not earlier than 1000 years ago.

The second set of dates are those obtained by the present author on samples from the Cape Ray Light site. This site produced three dates in the first half of the first millenium A.D. and one date of about 400 B.C. (Table 1). Here the discrepancy between early and late dates could not be explained on the basis of sample material, the latest date in this case being on charred fat and sand. The spread between maxima of standard deviations is 1470 years, from 700 B.C. to A.D. 770, and the average is A.D. 167. Such a wide age spread seems unrealistic in terms

of the homogenous nature of the occupation laver and the nature of the artifact complex from the site. Very little of the lithic material seems to have purely early Dorset affinities. Like Harp, this writer finds the later dates more acceptable than the early one. The three later dates (GaK-1906; Gx-1198; GaK-1907) give a spread between limits of standard deviation of 830 years, from 60 B.C. to A.D. 770, with an average of A.D. 372. These are more in line with the time span indicated by the comparison of artifact classes from this site to those from the Arctic (Table 3).

The two dates obtained from the Pittman site indicates an even wider range than the dates from the Cape Ray Light site. Both samples were on charcoal and dated to 830 ± 100 B.C. and A.D. 610 ± 100. Again the nature of the stratigraphy does not warrant such a lengthy occupation for the Pittman site, nor do the artifacts indicate an extremely early Dorset affinity of 800 B.C., though this site may be slightly earlier than the Cape Ray Light site. A third sample has also been dated from the Dorset component of the Pittman site. This produced a date of A.D. 170 (H. Devereux, personal communication). This dates falls within the range expected from the nature of the artifact inventory and taken together with the date of 610 A.D. seems to indicate an occupation within the first half of the first millennium A.D.

Another series of Dorset dates was obtained by the author on several sites in Placentia Bay in southeastern Newfoundland, and as yet unpublished. These sites all appear to be small to medium sized seasonal camp sites, with a single Dorset component, though several contained other cultural components as well (Linnamae 1971). Only one date was obtained from each site dated. The earliest date of 290 ± 210 B.C. (GaK-3274; NMC-444) was obtained from the Long Island Neck site near the

northern tip of Long Island. The New Grove site, a few miles to the south, produced a date of A.D. 220 ± 80 (GaK-3276; NMC-446). The latest date of A.D. 860 ± 90 (GaK-3275, NMC-445) originated from the Bordeaux-2 site on the east coast of Placentia Bay, near Arnold's Cove. Again, the dates indicate a long period of occupation of Placentia Bay by the Dorset people. The artifact inventories, though numerically small and containing only small amounts of diagnostic material, do seem to indicate an essential unity among Dorset sites in and around Placentia Bay. The west coast and northern sites show a strong affinity to the Placentia Bay material. The early date from the Long Island Neck site may possibly be associated with an Archaic component from this site. The other two A.D. dates are acceptable and are comparable to the west coast and northern sites in the similarity of their lithic complexes.

Summary

The majority of sites that have been radiocarbon dated in Newfoundland indicate quite an extensive period of occupation beginning somewhere during the first millennium B.C. and extending well into the first millennium A.D. It has not been possible to separate the artifact samples from these sites into distinct early, middle, or late components. The bulk of the artifact material does, however, have middle period affinities. Also, several sites, especially Cape Ray and Port au Choix-2 have their strongest clusterings of radiocarbon dates in the first half of the first millenium A.D. This would seem to indicate that the major occupation of Newfoundland occurred during the middle period. The earlier dates and artifact traits would then suggest that occupation was initiated during the early period. Probably this occupation was not very extensive. The presence of late artifact traits would indicate that

occupation extended into the late period, but became somewhat reduced and finally ceased.

THE DORSET COMPLEX IN NEWFOUNDLAND AND THE ARCTIC

The Dorset Culture Lithic Complex

Dorset culture traits that appear to have significance in time have already been outlined in Tables Two and Three. There is another group of traits that are found throughout the Dorset continuum and are present at most sites with large artifact samples. These features can be designated as general traits of the lithic complex, and because they do not vary greatly in time or space may even be considered to be core features of the complex.

Triangular chipped stone end blades have been found at almost all Dorset sites and are one of the most distinctive Dorset artifact classes. Only two major Dorset collections lack this type of end blade. None were found in the small Dorset collection from Walrus Island (Collins 1955: 28) nor were there any from the Groswater Dorset Phase of Hamilton Inlet, Labrador (Fitzhugh 1972:148-149). Only one triangular end blade was found at the Sermermiut site in Greenland (Larsen and Meldgaard 1958; Mathiassen 1958). Attribute variation of this end blade class does, however, occur both through time and space. Table Two indicates that the straight base variety tends to be concentrated in early to middle and late periods. Tip fluting is an early to middle trait, but occurs at a higher frequency in some areas, especially Newfoundland. Some Newfoundland end blades also have surface grinding facets, especially in the proximal area, and this feature does not occur in Arctic Dorset.

Burin-like tools are also common on Dorset sites. The rectangular or elongate shaped variety is well represented in all periods, but rather

infrequent on Newfoundland sites. The percentage of burin-like tools is very much smaller than triangular end blades on most sites, but, nevertheless, they are a distinctive part of the Dorset complex.

Another fairly general Dorset trait is the concave-edged knife. It has been found on early, middle and late sites, and is also present at all of the major Newfoundland sites. Triangular end scrapers, with either rounded, straight, or asymmetrical distal ends are similarly common throughout the Dorset continuum and are found at many sites, especially the Newfoundland ones. The end scraper class with an expanding or flaring distal end is similarly widely distributed both in time and space. Both blades and microblades occur generally throughout Dorset, with the latter especially abundant at some larger sites. The retouching of microblades near the proximal end to form a small tang is a common feature (McGhee 1970:95) and may indicate that they were used as tools as well as blanks for making other tools. Both flakes and blades were unifacially and bifacially retouched into a variety of forms including knives, scrapers, denticulates, and perforators. Such minimally shaped tools are again a common feature, especially at sites with large lithic samples. Abrading stones and rounded soapstone vessels are found during all periods and also have a wide distribution. To summarize, the following features can be considered to form the core of the Dorset lithic complex: triangular end blades; rectangular or elongate burin-like tools; concave-edged knives; triangular end scrapers; end scrapers with an expanding distal end; blades and microblades; flakes and blades retouched into knives, scrapers, denticulates and perforators; abrading stones; and rounded soapstone vessels.

In addition, there are traits that occur throughout the Dorset continuum but are much less widely distributed in space. They are not

useful as time indicators, nor does their spatial distribution indicate regional specialization as yet. These include asymmetrical triangular and side-notched knives; spatulate-shaped knives; quadrangular end scrapers; notched end scrapers; concave side-scrapers; notched ground slate end blades; and round-ended ground slate scrapers or chisels.

The Arctic Dorset complex also contains several traits that are not found or not common in Newfoundland Dorset. These include the rectangular burin-like tool which appears to be an important part of the Arctic Dorset inventory. Also Newfoundland does not have the burin-like tool with a triangular or faceted blade, found at Sermermiut (Larsen and Meldgaard 1958:62) and perhaps in the Lake Harbour area (Maxwell 1962: 53, Plate VI, Fig. D). Ground slate ulos and semi-lunate knives are not part of the Newfoundland complex, but these two forms do not appear to be very common in Arctic Dorset either. The ulo has only been found at the late Mill Island site (O'Bryan 1953:57, Plate XI, o) and the semi-lunate knife only at the Tyara site (Taylor 1968b:121, Fig. 25e). The square-based triangular knife from Sea Horse Gully (Nash 1969) and "box" based side-notched end blades from Hamilton Inlet (Fitzhugh 1972) are unknown from Newfoundland sites as well as from other Arctic Dorset sites.

Newfoundland Dorset bears a rather close resemblance to Arctic Dorset. Both share almost all of the core or general features of the Dorset lithic complex. The majority of the traits that are found on Arctic sites but not in Newfoundland have not yet been established as part of the core complex and appear to be minor traits, with restricted distribution in the Arctic. Newfoundland Dorset differs from the parent Arctic Dorset complex rather by the presence of features that the parent complex does not have. These appear to be innovations and will be discussed in the following section.

The Newfoundland Lithic Complex

Table Four is a listing of lithic traits that appear to characterize Newfoundland Dorset. Many of them have not been found outside the area while a few occur at single sites in the Arctic. Some traits also have restricted distributions in Newfoundland, several having been found only at one site. To conclude that such traits are distinctively part of the Newfoundland complex may be premature at this stage and it is difficult to assess the place and importance of restricted distribution traits within the complex. Traits that at present are found only at one Newfoundland site may be found at other sites as research and excavations progress. The trait may then become a major and distinctive element of Newfoundland Dorset. Similarly, some Newfoundland traits that are presently known from only one Arctic site may prove to have wider distribution in the future. These traits would then no longer be considered as distinctively Newfoundland Dorset, but rather part of Dorset culture in general.

The traits that are in such a nebulous position at present are: the chipped graver with a tanged point, found only with certainty at the Pittman site and perhaps at the Tyara site (Taylor 1968b: Fig. 26s); end scrapers with a "nipple" shaped working edge, prominent at the Cape Ray site but with the possible exception of the Joss site (McGhee 1971: Plate IV, r) have not yet been reported elsewhere; the polyhedral core with a double striking platform from the Cape Ray site; the small, stemmed adze or scraper made of ground slate from the Cape Ray site, a larger version of which may possibly have been identified as an ulo blade at Mill Island (O'Bryan 1953: Plate XI,o). Also found only at the Cape Ray site are the ground and chipped chert triangular end blade, elongated pebble wedges and the "flower-pot" shaped soapstone vessel. Pebble

TABLE 4

NEWFOUNDLAND DORSET - DISTINGUISHING LITHIC TRAITS

	Pittman	Cape Ray Light	Port au Choix-2	Upper Black, Eastern Point, Woodworth Pope's Point	Arctic occurrence
Narrow, high side-notched end blade, serrated edge			X	X	Lake Harbour (?)
Side blades with surface grinding	X		X	X	
End blades with surface grinding	X	X	X	X	Lake Harbour
Chipped graver, sickle-shaped tip			X	X	
Polyhedral core, discoidal	X			X	
Ground slate, large rectangular knife		X	X		
Soapstone vessel, asymmetric sloping sides		X			
Soapstone, disc/pendant		X		X	Sermermiut
Chipped graver, tanged	X				Tyara (?)
End scraper, "nipple" edged		X			Joss
Polyhedral core, double platform		X			
Ground slate, stemmed adze-scraper		X			Mill Island (?)
Ground and chipped, triangular end blade		X			
Soapstone, "flower-pot" shape vessel		X			
Pebble wedges		X			
Pebble choppers		X			

choppers and chopping tools, though found with a low frequency at both the Pittman and Cape Ray sites, probably cannot be considered distinctive of a culture, except perhaps the Olduwan. They have also been found at the Tyara site in the Arctic.

The remaining traits in Table Four appear to be more strongly established as distinctive Newfoundland traits.

Although side-notched end blades, both symmetrical and asymmetrical and with a variety of numbers of notches and notch shapes, are a common Dorset trait, one class appears to be confined to Newfoundland. This is the end blade with narrow, deep side-notches and serrated lateral edges. They formed 2.3% of the artifact samples from Port au Choix-2 (Harp 1964a:80) and have also been found at the Eastern Point site at Jackson's Cove (Devereux n.d.). Side-notched end blades with fine edge serrations have also been reported from the Sandy site at Lake Harbour (Maxwell 1960:33) but the shape and placement of the notches is different from the Newfoundland variety.

The Newfoundland chipped stone complex is also distinguished by a relatively high degree of surface grinding on several artifact classes. This occurs on side blades, on triangular end blades and on both symmetrical and asymmetrical side-notched end blades. The grinding facets on end blades are usually confined to the basal or proximal area of the artifact, and may cover most of the surface or only small area in the medial region. Grinding of end blades has also been reported from the Sandy site (Maxwell 1960:33) while grinding of side blades does not seem to occur outside Newfoundland.

A type of chipped chert graver with a sickle-shaped graving tip has been reported from two sites in Newfoundland. Three were found at the Port au Choix-2 site (Harp 1964a:80) and others from the Pope's

Point site (Devereux 1965) and the Eastern Point site (Devereux n.d.). None have been reported from the Arctic.

Though differences in shape of polyhedral cores cannot always be used as indicators of style or cultural preference, because shape variations may be dependent on the stage of utilization of the core (Laughlin and Aigner 1966), Dorset cores in general tend to have a rectanguloid or blocky shape. The Pittman site has produced one discoidal or rounded-shaped core and such cores have also been reported from the Eastern Point site (Devereux n.d.). A tendency to use rounded cores appears to be present in Newfoundland and not in Arctic areas.

The variety of ground slate implements in Newfoundland Dorset resembles that found generally in the Arctic. The amount of ground slate at Newfoundland sites is relatively small and hardly approaches the tremendous amounts reported from the early Dorset periods of the Iqloolik area (Meldgaard 1960b:590). Newfoundland does, however, have one distinctive ground slate form. This is relatively large, flat and thin rectangular knife found at both Cape Ray and Port au Choix-2 (Harp 1964b: 2). These implements are bevelled to a thin, sharp edge but their fragility and the softness of the slate would suggest that they could only be used for scraping materials such as skins or the cutting of snow blocks.

Both rectangular and rounded soapstone vessels are common in Newfoundland as well as in the Arctic. The relatively large soapstone sample from Cape Ray indicates an interesting feature about the shape of rectangular vessels: one vessel wall frequently slopes outward by 8^{o} to 15^{o} more than the other three walls. This attribute has not been reported from other Newfoundland sites but, these have not produced an adequate number of complete vessels to assess this feature properly.

Adequate soapstone samples from the Arctic have not reported this feature.

Small, flat soapstone discs may also be added to the list of Newfoundland traits. The Cape Ray site produced both oval and triangular discs while the Woodworth site had a triangular disc with a suspension hole. The Sermermiut site in Disko Bay also produced discs with holes (Mathiassen 1958: Fig. 8-39, 40), but this appears to be the only occurrence of such discs outside Newfoundland.

Two additional features of the Newfoundland Dorset lithic complex appear to differ from Arctic complexes. These do not appear on Table Four, which denotes only the presence or absence of traits, as these are attributes that vary in frequency and in size. The first of these is the presence of tip fluting or thinning on end blades. This trait has already been discussed as a time indicator of the early and middle span of the Dorset continuum. Though precise frequencies are not available for this trait from Arctic sites, it does not seem that their occurrence is nearly as high as the 30% recorded from the Pittman site and the 50% figure from the Cape Ray site. Meldgaard (1960b:592) has stated that such high frequencies are greater than those from the early periods at Igloolik. Whether this means that the trait is extremely early in Newfoundland and, as Meldgaard was inclined to believe, may have originated there, or whether it merely increased in popularity at a later time in Newfoundland cannot be determined with any certainty. As Table Two indicates, tip fluting is also found at many middle period sites, and is not exclusively an early trait. Therefore its high frequency in Newfoundland may indicate either the presence of an early component or a preference for this technique generally throughout the Newfoundland complex.

The microblade industry also exhibits some variations between the Arctic and Newfoundland areas. As a category, microblades are a common Dorset trait. We are just beginning to find out about the nature of both metric and non-metric attribute variations within the Dorset culture area and time continuum. McGhee (1970) has carried out a comparative analysis of some microblade attributes, and his results indicate that several attributes vary spatially. One of the most significant of these is the size of microblades. The larger ones are found in Newfoundland Dorset and the smaller ones in the Foxe Basin-Hudson Strait Arctic area. He also found that the retouching of proximal ends to form a blunt-edged tang occurs at a very low frequency in the Newfoundland samples while it is high in the Arctic, especially at the Joss site: the 300 to 200 B.C. period at the Jens Munk site at Igloolik, and the T1 and Tyara sites (McGhee 1970:91-95). Most of the sites used by McGhee in his study belong to the early period of Dorset, and these differences may reflect time differences, rather than regional differences. They may also, of course, reflect a combination of both factors.

Summary

The results of the above comparisons of traits between Arctic and Newfoundland Dorset indicate, first, that there is a high degree of similarity between the two. The Newfoundland complex has most of the traits of the Dorset lithic complex, but lacks some minor Arctic traits, as well as several early and late traits. Secondly, differences do occur between the two. Eight major traits of the Newfoundland complex are lacking or found at a very low frequency in the Arctic. An additional eight traits, though they have a more restricted distribution and importance in Newfoundland are very rare in the Arctic. Furthermore,

a high frequency of tip fluting and large microblades without proximal tangs may also be distinguishing features of the Newfoundland subarea.

SETTLEMENT AND SUBSISTENCE PATTERNS

The most definite remains of habitations of Dorset culture type in Newfoundland have been found at the large site of Port au Choix-2. Here there were remains of 35 to 40 shallow house-pit depressions stretched along several terraces close to the beach. They were all more or less square, consisting of one room measuring about 15 feet across and from 6 to 18 inches below the surface (Harp 1964a:23, Fig. 5). A long, rock-lined open fire-pit near the middle of the room was a common feature, and there may have been side-benches along the walls as well as a rear platform. The wall foundations were low gravel mounds. There were no rock-lined walls nor any indication of a stone slab pavement in the interior (Harp 1964b:4). The inland site at Pope's Point (Devereux 1965) contained several depressions that have been interpreted as the remains of house-pits. One of these was excavated. The house-pit seems to have been rather shallow, about one foot below the surface and rectangular in shape measuring 12 by 16 feet. The edges or wall foundations had been formed by scooping out the gravel from the middle and heaping it up along the edges. The site, however, produced two cultural components, one of them Dorset and the other an historic culture with the use of European metal. It is not clear from the remains and artifact distribution which of these cultures was responsible for the structure. A shallow circular house-pit depression was also found by Devereux at the South West Harbour site on Upper Black Island, but again several cultural components are present and the excavator believes that the structure does not belong to the Dorset component (Devereux n.d.), as it lacks direct

association with diagnostic Dorset artifacts.

There is little comparative data on Arctic Dorset habitation structures. Meldgaard (1960b:589; 1962) has published summary statements of the evolution of house types through periods I to V at Igloolik. The shape of the house remains rectangular from the earliest to the latest period. The earlier structures, from periods I to IV, are characterized by larger size, some measuring 45 x 23 feet, an open mid-room hearth and low benches along the walls. The later varieties, especially in period V, have an underground entrance passage with a cold trap, smaller rooms with side rooms for storage, and one raised bench against the end wall. Also, in the latest period, stones were used to line the inner side of the walls. The Newfoundland structures generally resemble the ones from periods I to IV from Igloolik. The McCormick Inlet site on Melville Island also produced structures very similar to the first four periods at Igloolik (Henoch 1964; Taylor 1964). Rectangular, shallow pit houses have also been found at Sugluk (Taylor 1958), Pelly Bay (Rousseliere 1964) and Payne Lake (Taylor 1959). At the late Dorset site on Mill Island the houses resembled the late period V ones from Igloolik. They had two rooms, each with an entrance passage and a single platform at the back (O'Bryan 1953:42).

At the Cape Ray site no features were found that could actually be identified as habitation structures. There were, however, concentrations of stone slabs, rocks, charcoal, hearth remains and artifact groupings that were identified as living areas of habitation zones. Nothing definite can be said about the precise character of these rather amorphous features, other than that they may be the scattered remains of structures. These habitation areas seem to resemble the remains of structures found at several sites in the Disko Bay area which have both

Sarqaq and Dorset components. Examples of sites where such remains were found include Iqdlorssiut I and Iqdluluarssuk I and II (Larsen and Meldgaard 1958:39-40; 44-45). The excavators interpret these as dwellings, but often, as at the Cape Ray Light site, the most conspicuous features are the hearths. Rocks are found scattered around the hearth, sometimes several side by side, suggesting perhaps some type of pavement of stones in the interior of the house. Sometimes the Disko Bay people incorporated existing high outcroppings of bedrock on the periphery of these living areas into the structure. One feature that seems to be present in the Greenland sites and lacking at Cape Ray, is the concentrations of small, round rocks in or near the hearths. Their suggested function is as cooking stones or as heating stones. Although a few similar kinds of rocks were found in the Cape Ray habitation areas they were not concentrated, nor were they particularly near any hearths.

In summary the living structures of Newfoundland Dorset peoples are rather similar to those in the Arctic. Initially this conclusion seems to indicate that the spread of an Arctic adapted culture into the much warmer subarctic environment of Newfoundland caused no need for an adjustment in housing style. However, the shallow house-pit type of dwelling with an open hearth near the middle is also common in the subarctic regions. The Beothuk peoples of Newfoundland are described by early European accounts as living in small semi-subterranean dwellings with a superstructure consisting of a frame of wooden poles and covering of hides (Howley 1915). It seems that this fairly simple type of dwelling was adequate both for the damper subarctic area as well as for the intense cold of the Arctic. The presence or absence of the snowhouse would be a more fruitful avenue to explore as regards the question of environmental influences versus cultural influences on cultural

changes. This type of dwelling seems to be confined to the Arctic area and was probably invented there. It is admirably suited to the intense cold of the Arctic winter but is not of much use in warmer parts of the year and has to be abandoned in very early spring. Though definite evidence is lacking, Taylor (1968b) believes that the snow-house was used by the Dorset people. If so, was its used continued in Newfoundland? There is only one very slim piece of interpretive evidence to indicate that it may have been. This is the large, very thin, flat bevelled-edged slate knives found at both the Port au Choix-2 and Cape Ray Light sites. They seem to be too fragile and large to have been used to cut hard or tough material. But they may have been used to cut snow, perhaps into blocks for use in building snow-houses. The utility of snow-houses in Newfoundland is not very great. They could probably be used for only very short periods, as there are frequent thaws during the winter, but they may have been used for temporary housing or shelter from blizzards.

One minor feature that should be mentioned in connection with shelter is the general lack of lamps in Newfoundland Dorset sites, especially in the large soapstone sample from Cape Ray, and the abundant amounts of charcoal and hearth remains on Newfoundland sites. Though open fires were also used in the Arctic, the scant amounts of firewood available meant that the bulk of the heating and cooking was done by oil burning lamps. Lamp fragments are much more common in the Arctic Dorset sites, even when the soapstone samples are small.

With Dorset culture we are dealing with a cultural area that spread across two different environmental and climatic zones in North America. Dorset culture was centered in the Arctic zone and seems to have originated there. One part, however, had established itself in the subarctic and relatively temperate environment of Newfoundland. The

differences between the two areas are great. In the Arctic, long cold winters and short cool summers are the rule. Only two to four months have average temperatures above freezing. The average for July is around 42°. Winters are long, often with five months of average temperatures below zero and nine months below freezing. January averages ranges from -8° to -30°F. In most of the Arctic precipitation is not over ten or 12 inches per year and summer rainfall accounts for nearly one half of the total. The winter snow, usually dry and powdery, is swept away by high winds leaving 75 to 90% of the surface free of snow. Conditions are variable, but it is common for ice to remain inshore for nine to ten months and often for the entire year. The subsoil is permanently frozen and topsoil development almost lacking. The vegetation is characterized by non-arboreal plants. Small trees, mainly willows, and shrubs are found only in sheltered and well-drained areas. Because of poor subsurface drainage bogs and areas of muskeg are prevalent.

Newfoundland climate is characterized by a relatively short winter of about four months. The January average temperate ranges from 12 to 28°F. Thaws occur during the winter months and in some years the snow may almost entirely disappear during a warm spell. Average temperatures from June to September are over 50°F, making the summer long but cool. Precipitation is abundant and evenly distributed throughout the years. Total amounts vary from 47 to 53 inches. Much of this falls as snow, the total snowfall ranging from 120 inches in the north to 80 inches in the south. Much of the coastline is enclosed by ice from December to March but the south coast is always ice free. Coniferous forest is the climax vegetation of the island, but occasional stands of deciduous hardwoods are also found. There are extensive areas of poorly drained treeless bog and muskeg, and exposed coastal areas similarly lack trees.

Agriculture can flourish in areas, such as the Codroy Valley, which have good soils and are sheltered from high winds.

The sophisticated and complex type of technology, transportation, housing and clothing, necessary to survival in the bitter cold of the Arctic winter, are not required in the much warmer and shorter winters of Newfoundland. However, the spread of Dorset culture to this area, so different climatically and environmentally, does not seem to have caused much change and re-adjustment, at least in the area of lithic material culture.

Despite the great differences between the two climatic areas, one element of the environment was surprisingly similar. This was the availability of similar faunal resources. In view of the fact that no major cultural re-adaptation or change occurred here, it seems useful to point out the similarity between the subsistence systems of the two areas. This similarity allowed an old way of life to be continued in a new area.

As in the Arctic, almost all Dorset sites known from Newfoundland are located on the coast. The reason for this seems to be the heavy dependence on sea mammals of different species. In the Arctic the mammals most heavily hunted were the ringed seal and the walrus. In Newfoundland the coastal sites are located in places which have easy access to the large herds of harp seals that are found on the drift ice in the early spring. Ninety percent of the midden bone from the Port au Choix-2 site was harp seal material. Also, many of the Newfoundland coastal sites are near major salmon streams. Fishing for char in the Arctic was an important seasonal subsistence activity in a part of the year when other sources were not available. In Newfoundland, salmon fishing in the late spring and summer also seems to have been a major part of the

food quest pattern for the Dorset.

The inland Dorset site at Payne Lake in northern Ungava was probably located near a crossing point on a main migration route of caribou herds (Lee 1967:35). In Newfoundland, the Pope's Point site also is located on such a water-crossing point on caribou migration routes. Thus in both regions the major subsistence elements, the seal, the fish and the caribou are available and can probably be caught or hunted by similar techniques and in broadly similar seasons of the year. The subsistence pattern, at least, may not have changed from the northern area to the southern one. Making basic re-adjustments to the environment, then, was not necessary for Dorset peoples in order to inhabit Newfoundland.

THE NEWFOUNDLAND ASPECT OF DORSET CULTURE

Dorset sites in Newfoundland are found on the west coast as far south as the southwest corner, the northeast coast to the Bay of Exploits, and on the southern coast in Placentia Bay. Also one site has been found inland on the Exploits River. It seems that there was an extensive and continuous occupation of the Island of Newfoundland by the Dorset culture. Present work that is going on in the province will continue to fill out the distribution of sites around the Island. Selected dates from the west coast sites, the northern site and the Placentia Bay sites seem to place this occupation from about 400 B.C. to A.D. 600-700. This would correspond to late early and middle period Dorset in the Arctic.

The lithic complex of Newfoundland Dorset shows an essential unity over wide areas. Port au Choix-2 has strong similarities with Cape Ray and some of the eastern sites, such as the Woodworth and Eastern Point

sites. Cape Ray in turn is very similar to the northern site on Sop's Island, as well as to the eastern sites. The southern sites from Placentia Bay, though their samples are small, also indicate a very close similarity to the other material.

When this complex is compared with Dorset sites in the eastern Arctic, several minor and major differences occur, both in artifact classes and in attributes. Classes that seem to be peculiar to Newfoundland occur in side-notched end blades, gravers, end-scrapers, microblade cores, ground slate and soapstone. Also the Newfoundland material seems to exhibit more grinding on end and side blades, more tip-fluting or thinning on end blades, larger and differently retouched microblades and blades, and the asymmetry of the angle of outslope on rectangular soapstone vessels.

Dwellings in Newfoundland are small, one-roomed shallow housepits, square in shape and with an open, stone-lined hearth near the middle. This generally resembles the common type of house structure found in Arctic Dorset. Habitation areas with central hearths and perhaps a stone slab pavement, similar to sites in Greenland, are also found in Newfoundland Dorset.

Settlement and subsistence patterns are very similar for the two areas. In Newfoundland most sites are on the coast. From them seal hunting was carried out in the spring, and fishing was done a little later in the year. The inland site near a major caribou migration route indicates that winter subsistence was partially based on inland land mammal hunting. Ecological patterns and adaptations seem to be very similar between the Arctic and Newfoundland. Therefore environmental differences are probably not a main cause of culture change. The major reasons for the development of a regional sub-assemblage in Newfoundland are

geographic isolation, complicated by climatic change.

FACTORS UNDERLYING THE DEVELOPMENT OF THE NEWFOUNDLAND DORSET COMPLEX

The differences that have been noted are probably due to geographic isolation more than any other single factor. Newfoundland is on the periphery of the Dorset world and its contacts with the Arctic most probably took place through Labrador and across eastern parts of the narrow Strait of Belle Isle. This may have been the major route both for migration of people as well as for the diffusion of ideas. The present state of archaeology in Labrador does not allow us either to support or repudiate this hypothesis. The Groswater Dorset phase from the Hamilton Inlet area shows some local traits and is different from the Newfoundland material in several respects, but this may be due to the fact that this phase, dated from 740 to 390 B.C. belongs to an earlier Dorset period (Fitzhugh 1972:28). Both variants have enough in common with each other, as well as with the core Dorset complex, to indicate that they were part of the same cultural continuum. Both variants are also different enough to indicate that there was a tendency for local developments and micro-evolutionary trends in Dorset culture. When, and if, evidence from other Dorset sites becomes available in Labrador the nature of these local developments may become clearer. We do not know if the differences that are apparent in this early material intensified through time or if contact with the eastern Arctic was maintained so that local differences were later ironed out. Similar developments could have occurred in Newfoundland if late phases of Dorset were found here.

Another possible route of influence between the Arctic and Newfoundland is eastward from Hudson Bay, across Quebec and the Gulf of St.

Lawrence. Harp has been carrying out work in the region around Richmond Gulf and has found a complex of Dorset sites there, but nothing south of the Gulf. He also reports that the material has some similarities to the Port au Choix-2 material and seems to date around 500 A.D. (Harp, personal communication). The intervening area between Hudson Bay and Newfoundland has so far, however, failed to produce any Dorset material. Also the southwestern Labrador coast of the Strait of Belle Isle, though rich in prehistoric remains has produced little Dorset material (Harp 1963). The route east and south from Hudson Bay must be considered of very minor or secondary importance as a communication and migration link between Newfoundland and the Arctic. Thus it can only be concluded that, because of its geographical location on the southern periphery of the Dorset culture area, Newfoundland maintained its ties to that culture through only one region--Labrador. This cuts it off, more than any other Dorset variant in the Arctic, from its parent culture.

Dekin (1969) has suggested that cultural movements across the wide geographical expanses of the eastern Arctic were significantly influenced and affected by climatic change. He hypothesizes that changes in climate influenced ease of travel and may have caused alternate periods of cultural homogeneity and cultural diversity. On a very general level he sees warm, dry climatic periods as allowing widespread travel and migration, while wetter, colder periods led to restricted movements and local isolation, which in turn may have produced local cultural differences and regional diversity. He has presented a summary of climatic data for the eastern Arctic. A warmer and drier stage is postulated from 200 B.C. to A.D. 300-400. This then would be a time of easy travel and wide ranging migrations. It does indeed, seem to correspond to a period of wide expansion of Dorset culture in the Arctic, and may also

be the time of the first arrival of these people to Newfoundland. This is followed by a wetter and colder stage from A.D. 300-400 to A.D. 800-900. This period would seem to encompass the time of the major occupation of Newfoundland by Dorset culture. With the colder conditions causing increased difficulty in travel and communication, the Newfoundland Dorset people may have become more and more isolated and begun to develop changes in cultural patterns that differentiated them from the Arctic Dorset pattern. These fairly direct correlations between climatic and cultural change are, of course, complicated by our lack of knowledge of Dorset transportation methods. Whether they knew the use of boats and dog traction is still in dispute. Such features would have had major consequences in certain types of travelling situations. For instance, if travel is carried out without boats, then colder, wetter periods when ice cover is more extensive may actually favour the spread of Dorset culture. Similarly, Arctic ice hunting cultures seem to be better adapted to colder periods when the ice is solid and extensive rather than warmer periods when the ice is loose and drifting. In the historic period at least, warm winters have meant poor winter sealing. Such factors may complicate the process of migration in relation to climatic changes. However, it seems reasonable to postulate that the geographic isolation of Newfoundland, in conjunction with an adverse climatic period, was responsible for the development of the regional flavour of Newfoundland Dorset.

Conclusions

This study has presented a synthesis of archaeological information concluding that, during the last centuries B.C. and the first half of the first millennium A.D., Newfoundland was extensively occupied by Dorset people. Dorset culture probably originated in the Arctic and underwent no major adaptive changes after it became established in the subarctic environment of Newfoundland. Subsistence, habitation, and settlement patterns remained essentially the same. There are points of resemblance in the environments of the two areas, and the Dorset people had to make no basic changes in their way of life on arriving in Newfoundland. They retained a subsistence pattern that consisted of sea-mammal hunting and fishing in the spring and summer and land-mammal, especially caribou, hunting in the fall and winter. As in the Arctic, most sites are located on the coast and near good salmon streams. The one known inland site on the island is located near what has in historic times been one of the main caribou migration routes.

However, this study has also indicated that Dorset in Newfoundland differs from that known in other areas of the Arctic. These differences are especially evident in stone tools, and do not suggest changed functions for the artifacts but rather in styles of making them. Such changes may be the result of isolation from the Dorset core area and perhaps of contact with alien traditions, especially late Archaic cultures on the island. Unfortunately, information on cultures contemporaneous with Dorset is very meager, precluding the possibility of

precise comparisons. At any rate, the anomalies in Newfoundland Dorset do not seem to be the product of adaptation to the environment.

The Dorset culture area is immense and Newfoundland is only one of several regions within it. It is geographically peripheral, as are: Victoria Island and Coronation Gulf in the west; the northern archipelago from Melville Island to Ellesmere Island and perhaps northern Greenland; southern Greenland; and the western Hudson Bay region. The Foxe Basin-Hudson Strait region contains the greatest density of sites and sites with the longest continuous occupation spans, and is probably the core area of Dorset culture. This may also be the region where it developed from a pre-Dorset cultural base.

Future research should be oriented both towards fieldwork in archaeologically unknown areas in the Arctic, as well as to systematic, detailed analyses and comparisons of artifact complexes in order to establish the extent of regional variation. The reasons for variation may turn out to be geographical isolation, or they may be due to environmental differences, or a combination of both of these and other factors such as contact with non-Dorset cultures and climatic changes. Researchers may find that alternating periods of climatic deterioration and amelioration have influenced Dorset migrations and communicative ties between regions. When more is known of Dorset regional variation, then Dorset internal dynamics and environmental and geographical relationships can be formulated more explicitly.

PART THREE

SUPPORTIVE DATA

Methodology

The artifact sample from the Dorset deposit of each site was treated as a single component. The occupation layers at both sites, though quite deep and extensive in some areas, did not show any stratigraphy or differentiation that could have been used as a basis for separating the component into temporally significant units. An attempt was made to excavate both occupation layers by arbitrary depth units. For reasons already outlined in the section on excavation and stratigraphy, this method was not successful.

The artifact sample from the Cape Ray Light site will be presented first and that from the Pittman site second. All artifacts, except for one short piece of twined seal hair string from the Cape Ray site, are made of stone. The description of the lithic artifacts has been organized by categories and each category is further divided into smaller groupings or classes. This follows the system used by Taylor in his analysis of the Arnapik and Tyara sites. A class is taken to mean "a specimen that possesses, or a group of specimens that share, one or more physical attributes that distinguish it or them from the rest of the sample" (Taylor 1968b:15). The category and class divisions are based on form and chipping techniques in most instances, and in some cases the material used. The present analysis has tried to utilize, to as great an extent as possible, the specific categories set up by Taylor (1968b:51) to describe his Tyara site material, so that some consistency may result in Dorset descriptive terminology and so that comparisons can be more easily made from one site to another. Taylor uses nine lithic categories

in his descriptive framework. Seven are similar to those used by the author: bifacial end and side blades; ground slate; scrapers; cores; blades and microblades; soapstone; and debitage. Taylor's Category XI, tools on a random flake, has been enlarged to include all blades and flake tools as well as used flakes. Also his category of miscellaneous stone artifacts was not used, rather all rough stone items were put into a category of their own. Finally, the single organic artifact from the Cape Ray site is included as a miscellaneous category in the present analysis. The class divisions within each category show considerable variation between these two Newfoundland sites and Taylor's Tyara site. These may be due to the space and time differences involved.

At the present state of artifact analysis, a typological system has not yet been developed for Dorset lithic material. Although many sites have been excavated there are few full artifact descriptions available in print on which to base descriptive or morphological types. Nor do we know enough about the temporal or spatial significance of artifact classes and attributes to be able to formulate historical-index types.

The two largest classes of artifact, triangular end blades and microblades, were analysed with the aid of punch cards and computers. The remainder of the classes were handled in a more traditional way. Some classes were so small that each artifact was described individually while for other larger classes, averages and ranges for metric attributes were obtained. Morphological and manufacturing attributes were idealized for larger classes and important variations noted. Each class is first described by its most distinguishing form characteristic. Then chipping and other manufacturing and finishing techniques are noted. Metric characteristics are given next, each measurement is to the nearest 1/10 mm. Finally, whenever possible, an interpretation of the artifact's

function is presented and its importance in the overall Dorset lithic complex is assessed.

Artefact Analysis

CAPE RAY LIGHT SITE

The Cape Ray Light site artifact sample contains 24,346 specimens. Of these 4,797 are worked and the remainder is stone refuse (Table 5). This same table also indicates the distribution of categories and classes at the three major site areas. In the table, S denotes that the material was found on the surface, and III that it came from the occupation layer. In terms of artifacts recovered per square foot of area excavated, Area C was the highest with 6.2, Area E next with 5.0, and Area F the lowest with 3.8. These figures can only be taken as rough estimates since they are not based on volume of occupation layer excavated, but they do show a decrease of artifact yield from the eastern to the western part of the site.

The proportions of most categories and classes are relatively equal for the three site areas. The exceptions to this are the lower proportion of soapstone items found in Area F and the slightly lower proportion of end scrapers in Area E. Excluding retouched blade and flake tools, used flakes and core preparation detritus, about 56% of the artifact sample is made up of four classes: triangular end blades; end scrapers; microblades; and soapstone. These are the commonest artifacts and make up the bulk of the Cape Ray site artifact sample.

The majority of the artifacts are made either from chert, quartz or soapstone, while minor material types include slate, quartzite, sandstone and granite. Breakdown by material is given under each class

TABLE 5

SITE DISTRIBUTION OF ARTEFACT MATERIAL
CAPE RAY LIGHT SITE

	Location											
	Area C			Area E			Area F			S	Total	% of total artefacts
	S	III	Total	S	III	Total	S	III	Total			
End blades, triangular	15	180	195	13	134	147	11	121	132	53	527	10.99
End blades, side-notched all classes and fragments		14	14		11	11	2	13	15	6	46	.95
End blade fragments	7	37	44	2	24	26	5	24	29	5	104	2.17
Side blades	1		1		1	1	1	1	2		4	.08
Burin-like tools		1	1					1	1		2	.04
End scrapers and fragments	29	195	224	24	126	150	24	147	171	58	603	12.57
Side scrapers, concave	2	5	7	1	3	4		3	3		14	.29
Ground slate and chipped and ground slate	6	49	55	12	26	38	26	24	50	5	148	3.09
Microblades	25	328	353	31	180	221	15	214	229	83	886	18.47
Core preparation flakes and detritus	50	377	427	33	197	230	44	223	267	82	1006	20.97
Polyhedral cores and fragments	2	38	40	1	13	14		9	9	10	73	1.52
Polyhedral core blanks		3	3	1	6	7		3	3	3	16	.33
Flake cores and fragments		19	19		15	15	1	28	29	13	76	1.58
Core flakes		15	15		8	8		8	8		31	.65
Soapstone	35	158	293	9	209	218	6	99	105	56	672	14.01
Blade and flake tools, and used flakes	14	186	200	6	146	152	9	122	131	36	519	10.82
Rough stone		25	25	5	20	25		14	14	5	69	1.44
Miscellaneous - cordage									1		1	
TOTALS			1916			1267			1199		4797	99.99%
Debitage (see table 10)											19,549	
									Overal TOTAL		24,346	

description. The high proportion of chert and quartz in the debitage sample reflects a similar situation in the artifact sample.

CATEGORY 1: BIFACIAL END AND SIDE BLADES

Triangular end blades - total 527 (Fig. 15 a to f)

These end blades have straight to slightly convex lateral edges and the base may vary from straight to deeply concave. The tip is generally sharp or slightly rounded but sometimes also concave and blunted.

Table Six lists the results of measurements on several attributes that define size parameters for these end blades. These attributes were measured to the nearest 1/10 mm and the values recorded on a computer data card for each end blade. A computer was then used to generate the statistics that appear in Table Six: range; mean; standard deviation (s.d.); and coefficient of variation (c.v.) which is a ratio of the standard deviation to the mean. This last statistic is a measure of the amount of variation present within each attribute and is used for a comparison of variability between different end blade attributes from the same site as well as between the two sites.

In the Cape Ray sample all attribute measurements were unimodally distributed, indicating that there was a general tendency to make end blades conforming to a certain size, that is reflected by the mean values of these attributes. It also indicates that end blade size did not change greatly throughout the occupation. However, the degree of variability for these attributes is rather high. For all continuous attributes, except distance of maximum width from the base, standard deviations are about ⅓ of the means. This means that there was considerable variation in size of end blades at any one time or that pressures to select sizes close to the mean were not very strong. There

is lease standardization in the location of the distance of maximum width from the base where the standard deviation is almost 2/3 of the mean. This attribute reflects more the shape of the end blade than its size and may be part of other selective pressures not related to size.

In overall size, both very small and large end blades were present in the sample. Such categories are subjective and arbitrary, but in comparison with sizes from other sites (Tyara and T1), 20 mm seems acceptable as a maximum length for small end blades and 40 mm a minimum length for large end blades. Using these figures, about 20 specimens could be described as small and about 30 as large. The remainder would fall between these two and could be called medium sized. Length and width measurements were not related in a patterned way. In other words, there were some short, broad specimens as well as long, narrow ones. But generally the maximum width tended to be about half, or slightly more than half, of the length. The maximum thickness tended to occur about ½ way along the artifact and near the median line. One reason for this may be that thinning from the tip, or tip-fluting, and thinning from the base did not overlap or meet. This would leave the middle part of the end blade the thickest. But end blades without either tip or basal thinning also had their greatest thickness at approximately the half-way point.

Table Six also outlines breakage categories for triangular end blades. "Complete" end blades contain a few specimens with the extreme tip area missing, but no other broken areas. Another group was complete except for a small part of the base, usually one of the corners, and a part of one of the lateral edges. These have been designated as tip and part of body and base present in Table Six. Those that have a complete base and a substantial amount of body area were termed basal half

TABLE 6

METRIC ATTRIBUTES OF TRIANGULAR END BLADES FROM BOTH SITES

	Cape Ray Light Site	Pittman Site
Maximum length (L)		
Number (N)	228	87
Range	12.2-56.1 mm	14.1-48.2 mm
Mean	28.82 mm	24.55 mm
Standard deviation (s.d.	7.34	6.55
Coefficient of variation (c.v.)	25	27
Maximum width (W)		
N	217	76
Range	7.3-33.1	5.7-25.2
Mean	16.40	15.63
s.d.	4.06	3.88
c.v.	24	26
Distance of W from base		
N	160	66
Range	1.1-9.0	1.2-9.3
Mean	3.18	3.54
s.d.	2.05	2.25
c.v.	64	64
Width of base (BW)		
N	227	69
Range	7.3-30.3	8.2-21.4
Mean	15.25	14.18
s.d.	3.78	3.10
c.v.	25	22

TABLE 6 (continued)

	Cape Ray Light Site		Pittman Site	
Maximum thickness (T)	382		142	
N	382		142	
Range	2.1-9.4		2.3-9.1	
Mean	4.36		4.09	
s.d.	1.17		1.15	
c.v.	27		28	
Distance of T from base				
N	336		92	
Range	3.1-26.2		4.1-23.4	
Mean	13.73		11.76	
s.d.	4.16		3.65	
c.v.	30		31	
Completeness	N	%	N	%
complete	147	27.8	47	25.8
tip, part of body and base present	92	17.5	45	25.2
basal half fragments	47	8.9	13	7.3
tip fragments	106	20.0	29	16.3
body fragments	53	10.1	20	11.2
basal fragments	82	15.6	25	14.0

fragments, whereas those with a complete base and no body area to speak of were basal fragments. Tip fragments included all those with the tip present but broken above the basal corners. Finally, body fragments are those that have neither tips nor bases.

Of the incomplete or broken end blades, about 34% are either basal or basal half fragments and about 28% are tip fragments. This indicates that breakage occurred most frequently across the short axis of the specimens. This may relate to the manner in which they were hafted to projectile shafts. As the term end blade implies, these specimens were end hafted, with the basal portion inserted into the shaft or the harpoon head. The area of breakage perhaps coincided with a line marking the limit of the hafting element.

Shape, retouch and manufacturing attributes are outlined in Table Seven. These are generally based on an outline of projectile point attributes prepared by Reeves (1970) for use with computer aided analyses. Several possible attribute states were listed for each attribute. The end blades were examined for these characteristics and the results entered on data cards. Percentage occurrence of attribute states was generated by the computer.

There seems to be some variation in the form of the tip. Almost equal numbers are sharp or rounded. If these end blades functioned to tip projectiles such as harpoons, spears or darts, it seems to matter little if the end blade was sharp and pointed. The force or momentum of the released projectile was probably enough to penetrate the hide of the prey. This also may explain the presence of the few specimens that have a blunted straight tip or concave one.

The shape of the base in a great majority of cases is concave. The amount of concavity varied from very slight to pronounced. The

TABLE 7

SHAPE, RETOUCH AND MANUFACTURING CHARACTERISTICS
OF TRIANGULAR END BLADES

	Cape Ray Light Site	Pittman Site
Tip Form		
sharp	28.7%	21.5%
rounded	27.9	29.1
blunted or concave	7.8	13.9
indeterminate	35.7	35.4
Base Shape		
straight	5.1%	9.5%
slightly convex	.4	-
slightly concave	28.1	21.2
moderately concave	33.8	21.7
indeterminate	32.6	47.5
Cross-section Shape		
plano-convex	56.9%	44.4%
biconvex	30.8	40.4
convexo-triangular	8.9	8.4
biplano	.4	5.1
indeterminate	3.0	2.8
Longitudinal-section Shape		
plano-convex	32.4%	33.3%
biplano		1.4
biconvex	24.8	37.1
concavo-convex	2.6	6.5
asymmetrically ovate	22.2	20.4
indeterminate	18.7	3.7
Body Symmetry		
symmetrical	52.4%	39.1%
slightly asymmetrical	15.3	25.7
indeterminate	32.3	35.2

TABLE 7 (continued)

	Cape Ray Light Site	Pittman Site
Tip Thinning ("Fluting")		
present - 2 flakes	38.1%	24.0%
present - 1 flake	5.7	1.1
absent	40.9	59.8
indeterminate	15.2	15.1
Basal modification		
thinning - dorsal	22.0%	25.7%
thinning - ventral	3.6	2.2
thinning - both	40.9	27.4
grinding - dorsal	.2	-
grinding - ventral	1.1	-
grinding - both	2.1	-
grinding and thinning	2.3	-
absent	2.8	11.2
indeterminate	24.9	33.5
Serrations-Lateral Edge		
present	.8%	-
absent	80.9	87.9
indeterminate	18.3	12.1
Material		
chert	96.8%	77.7%
quartz	.4	-
quartzite	1.5	15.6
miscellaneous and unknown	1.3	6.7

amount was not measured rather it was assessed by the author. Straight based end blades were not many, but were present. A straight base on triangular end blades seems to be an early trait in Dorset, as it occurred with overwhelming frequency at the proto or early Dorset site T1 on Southampton Island and other early site (see Table 2).

Cross sections are confined to a few dominant types. Those with a plano-convex sectional shape are not unifacial; the specimens have been retouched on both surfaces, though not as carefully on the flat surface. For end blades of this shape, the convex surface was termed dorsal and the plano surface ventral. The specimens that are biconvex tend to have one surface slightly flatter as well. The triangularity of one surface in the convexo-triangular specimens is usually caused by the presence of two tip thinning or fluting scars, which leaves a ridge down the middle of the artifact. If the fluting scars are deep, this will give a triangular shape to this surface of the artifact. The shapes of the longitudinal sections resemble those of the cross sections fairly closely. There is, however, a group that has an asymmetrically ovate shape with the dorsal surface more pronouncedly curved. This again is reminiscent of the general trend toward plano-convexity that characterizes most of the end blades.

In body outline, some of the end blades are slightly asymmetrical, especially as concerns the basal corners. One tends to be slightly more rounded or pointed than the other. Most of the specimens are highly symmetrical.

In overall retouch characteristics, these end blades have been made with much care. They are even in outline and the surfaces do not have many irregularities. The dorsal convex surface on many specimens shows even parallel flaking along the lateral margins that converge to

a smooth, slightly rounded median line down the length of the artifact.

Two areas on the artifact seemed to have received special treatment. One of these is the tip area. In over half of the tips present in the sample, flakes have been removed downward from the tip on one surface (Fig. 15e). The removal of these flakes, usually two and parallel to each other, has left a ridge along the median line of the end blade and two smooth concave flake scars that somewhat resemble flutes. This attribute has been termed tip fluting or thinning and in some cases the end blades have been described as keeled (Taylor 1968b:61). The flake scars usually do not extend more than half-way down the length of the artifact, where they break off with a sharp hinge fracture. Their purpose may have been to produce a sharp edge in the tip area of the blade or to produce a sharp ridge on the ventral surface as an additional cutting and piercing facet. Such tip fluting or thinning occurs throughout early and middle periods in the eastern Arctic but seems to be especially common in Newfoundland.

Special retouching and finishing occurs in the basal area as well. The most common form of alteration is thinning by longitudinal flaking from the basal edge toward the tip (Fig. 15 a). This flaking does not usually extend beyond half of the length of the artifact. Usually the thinning flakes are small and short but a couple of specimens have on long linear flake removed giving the base an almost fluted appearance (Fig. 15 f). Grinding in the basal area of the surface occurs on a total of 30 specimens or 5.6% of the sample. Usually it is confined to a small, flat triangular facet that does not extend to the edges nor more than half-way along the length of the artifact (Fig. 15 b). Grinding occurs more often on both surfaces than on one and sometimes both grinding and thinning are present on the same specimen. Surface

grinding of end blades seems to be a predominantly Newfoundland trait.

Serration of the lateral edges was rare. Sometimes the edge was rough or irregular as a result of the overall retouch flaking but a definite saw-tooth effect or denticulation occurred only on four specimens.

In summary, triangular end blades were probably used to tip hunting implements especially projectiles. They vary in size and the smaller ones may have been used on arrows, although no direct evidence exists for the use of bows and arrows in Dorset culture. The larger ones were most probably used on the ends of harpoons. Their size is certainly compatible with the size range of Dorset harpoon heads. These end-hafted blades seem to have been inserted at least half-way into the shaft, judging by the amount of basal thinning and grinding which may have been done to prepare the basal part for easier insertion into the shaft. Also, the higher proportion of tip and basal fragments in the sample points to end hafting. The sample has affinities with both earlier and later periods of Dorset. Straight bases and tip thinning are early traits and broad end blades with concave bases resemble later ones.

Side-notched end blades, single symmetrical notches -- total 10 (Fig. 15, g)

All of these specimens are made of chert. There is considerable amount of variation in size and form within this class of end blades. One group of four specimens are plano-convex in cross section and appear to have been made from blades or microblades. The flat ventral surface often shows the remnants of a ridge and longitudinal scar such as are found on microblades. They generally have a broadly concave base and broad, shallow notches. Some of these notches are so shallow and irregular that the points almost appear stemmed. The lateral edges are gently convex and converge to a sharp or rounded tip. In length,

they range from 19.2 to 32.2 mm and are fairly narrow, averaging about 10.5 mm in width.

One specimen has straight sides and a straight base with very shallow notches quite near the base (Fig. 15, g). It is also biconvex in section and larger and broader than the previous four. Another specimen has an extremely concave base and well made notches about half-way up the length of the end blade. The remaining end blade has broad side-notches that are quite asymmetrical in shape and placement, but in overall shape resembles the first group. The remaining three all have slightly convex sides, concave bases and are all biconvex in section form. Their notches are all broad and narrow.

In this group of ten side-notched end blades, three have tip fluting and two have the basal area thinned by a series of short longitudinal flakes.

As a group, these end blades were probably hafted to the ends of projectiles. Their small numbers within the artifact sample and the apparent carelessness with which the notches were made indicate that they were not an important part of the hunting tool-kit. Their variation in size and shape seems to point to a variation in their function as well.

Side-notched end blades, multiple notches -- total four (Fig. 15, h, i)

All specimens are of chert; two are complete, one has the basal edge missing and one is a basal fragment. The two complete end blades have three to four notches on either side, extending along the entire lateral edge of the artifact (Fig. 15, i). It seems that if these blades were end hafted, the notches near the tip end were not used for hafting purposes but to give the edge a denticulate cutting margin. Both of

these are plano-convex and have a concave base. They vary in length from 29.1 to 32.2 mm and in width from 12 to 12.2 mm. The remaining end blade has two notches on either side, opposite each other. The basal edge is missing but the sides are convex and the sections are quite definitely biconvex in profile. The notches are broad and shallow but well made and extend approximately half-way up the artifact. One side exhibits surface grinding in a narrow band up the middle, extending to about 16 mm from the base. This end blade was 32.2 mm long, 12.2 mm wide and 4 mm thick. A fragment of one basal corner with the remains of a lateral edge containing two notches was also found and seems to belong in this class. The multiple side-notched end blades probably had similar functions as the single-notched variety, i.e. they were tips for hunting projectiles.

Asymmetrical side-notched end blades - total 5 (Fig. 15, p, q)

These specimens have well formed symmetrical notches but are definitely asymmetrical in body outline. Because of this, they may have functioned more as knives than as tips for projectiles. They vary in shape but one edge is always straighter than the other. This curved edge may be pronouncedly convex or almost sickle-shaped. Most tend to be plano-convex both in longitudinal and cross section, but one is definitely concavo-convex in longitudinal section. Their notches all tend to be small and shallow but well made and close to the base. They range in length from 18.5 to 56.2 mm, in width from 12.2 to 31.4 mm and in thickness from 3.7 to 5.7 mm. Four are made from chert and one from greyish quartzite. One specimen has basal thinning by flaking on both sides.

Side-notched end blade fragments - total 27 (Fig. 15, j to l)

These fragments cannot be identified as to specific class so they are described together in this section. Fourteen of these are basal sections (Fig. 15, j to l). Seven of these basal sections have two broad but well defined notches and five have a pair of shallow and rather vague notches. Of these 12, six have a concave base and six have a straight base. Basal thinning occurs on seven of these side-notched end blades. The remaining two basal sections are more stemmed than notched (Fig. 15, j to l), and one of these may even be termed corner-notched. These basal fragments may belong either to projectile end blades or to asymmetric knives.

Twelve specimens are basal corner fragments and each has one notch extant. Four of these notches are well defined and broad while eight are vague and shallow. The remaining specimen in this class is a large quartzite biface that has the tip half and the basal part missing. It is vaguely leaf shaped and the sides show the beginnings of shoulders near the basal area, which may have been the start of a stem. This is probably some type of heavy knife that may have been end hafted. Measurements are 70.5 mm by 35.7 mm, at the shoulders, and it is 12.5 mm thick.

Trianguloid bifacial knives - total 22 (Fig. 15, m to o)

The specimens in this group have a straight to slightly concave base and are definitely asymmetrical in body shape. Sixteen of these knives form a sub-grouping within this category. They are plano-convex in cross section. One of the edges is straight and the other expands out from the base in an even curve towards the tip. If the convex side is taken as the dorsal surface, then the convex edge is on the right

side on ten specimens and on the left on six. The tip is rounded or even blunted on 14 and sharp on two. Fourteen had basal thinning and seven specimens were tip fluted. Their length varied from 18.1 to 36.5 mm, their width from 14.2 to 23.2 mm and their thickness from 4.9 to 5.7 mm.

The remaining four trianguloid knives show slight variations on this basic form. One of them is biconvex and the straighter of the two edges is slightly concave. One is broad and squat, almost approaching an equilateral triangle in shape, with asymmetrical basal corners, while the last is a long narrow triangle with one side slightly convex and the base concave.

Two fragments seem assignable to this class as well. One of these is a basal fragment whose lateral edges are definitely asymmetrical. It also has grinding on both surfaces. The other is a tip fragment with one edge concave and the other convex. This fragment may also have been side-notched as no indication of basal form is present.

These asymmetrical trianguloid specimens were probably end-hafted or perhaps end and one corner hafted into bone or wood handles and used as knives. They are all certainly too asymmetrical and irregular to have been used on projectiles.

Side blades - total 4 (Fig. 18, a and k)

Figure 18a is an ovoid shaped side blade, biconvex in cross section and bifacially worked. The straighter edge is parallel flaked to a thin sharp cutting edge whereas the convex edge is rough and thick, almost blunted and was probably the hafted side. This side blade measures 33.6 by 20 mm and is 7.2 mm thick.

Two specimens are more triangular in shape with a straight base

and one straight side. They differ from triangular knives by having one lateral edge much thicker than the other. The convex edge is well finished and narrows evenly down to a thin, cutting edge. One of these is large, measuring 32.5 by 15.1 and 8.7 mm while the other is smaller being 20 by 15.1 by 4.2 mm. The remaining specimen (Fig. 18, k) is almost rectangular in shape. The sides expand slightly from a narrow, straight base. One side proceeds directly to the tip, which is broad and rounded, while the other expands outwards, and then, about a third of the way up, contracts sharply toward the tip. This side blade is very thin, 2 mm, and plano-convex, but bifacially worked. From the manner of retouch, the straight edge appears to have been the hafted side and the convex edge the exposed cutting side. All the specimens are made from chert.

Burin-like tools - total 2 (Fig. 18, b and c)

These are not true burins, because they do not have scars indicative of burin spall removal. They are called burin-like because they may have functions similar to those of a burin, such as gouging, grooving and incising bone. It appears that the straight lateral edges may have been formed by burin blows previous to the grinding of these edges.

Both of the specimens from the Cape Ray Light site are fragmentary. The basal fragment has a straight base and two broad side-notches (Fig. 18, c). Beyond the notches, one edge is concave and the other is almost straight. Neither of these edges has been ground, but this may be because of their closeness to the base and grinding of edge on some burin-like tools did not begin until quite close to the distal end. Both surfaces, however, have been heavily ground to flat and straight planes.

The other specimen is a distal end fragment (Fig. 18, b). One lateral edge is bifacially chipped with no grinding while the other has been ground to a straight single bevel. The distal edge has been ground to a double bevel. The corner where these two ground edges meet is sharp and strong and could easily have been used for working bone. The maximum thickness of this fragment is 2.8 mm. Both burin-like tools are made from chert.

Bifacial end blade fragments - total 104

These fragments are unidentifiable as to the class of end blade that they belong; some may be from triangular or side-notched end blades while others may be from knives. One hundred and two are chert and two are bluish quartzite. Thirty-two are tip fragments, some of which are thin and plano-convex and a few are biconvex. Most tip fragments are very small but on 11 there are traces of tip fluting. Fifteen fragments are from the base area. Three have a concave base and are well chipped and may be from triangular end blades or asymmetric knives. Eight have a straight base and straight sides expanding outward from this base. Since no artifacts were found of this shape, these fragments remain unidentifiable. Four are thick, irregularly flaked bases and may also belong to flake knives. The remaining 57 specimens are mid-sections, corners or edge fragments of some form of bifacial tool.

CATEGORY 2: GROUND SLATE

Triangular end blades -- total 7 (Fig. 16, j and k)

Three of the specimens are complete enough to indicate something about the size and shape of these end blades. The remaining four are tip fragments.

The first three are made from a fine, dense, dark-grey slate. Two of theseare complete and one appears to have part of the basal area missing. One of the complete ones, Figure 16 j, tends to be diamond shaped in outline and is also the smallest and thinnest of the three. It has a flat base, straight sides that first expand outward from the base and then come together presumably to a point, but the tip has broken off. The basal and lateral edges all have a narrow bifacial bevel. The surfaces are flat and smooth. The length of this specimen is 62.7 mm, its maximum width 20.6 mm and its thickness 6.1 mm. This type of end blade may be suitable for tipping one of the larger types of Dorset harpoon heads or for a smaller size of spear.

Another specimen (Fig. 16, k) is much larger than the previous one and more triangular in shape. It has a straight base and slightly convex sides that meet at a tip that was probably sharp but now is dulled by wear. In cross section, it is plano-triangular. One surface is flat and the other has a median ridge which is interrupted by a flat, triangular shaped facet at the basal area that makes the base thinner for ease of hafting. The lateral edges are not sharp, but flat and straight. Perhaps these borders have not been finished. The artifact measures 101 mm in length, 33 mm in width and 11 mm in maximum thickness. It seems to be too large for tipping harpoon heads and was probably used as a large spear head.

The last of the describable end blades has the basal and tip area missing. It is generally thin and delicate with sharp lateral edges that are slightly convex. One surface resembles the ridged surface of the previous one in that it has three facets and a median ridge. The other surface is gently convex. Its broken length is 29.7 mm, its width 16.1 mm and its thickness 4.1 mm. In size and function,

it seems to be similar to the first end blade described (Fig. 16 j).

There are also four tip fragments that seem to belong to the triangular type. Three of these are of dark grey slate and one of a beige slate. All tips are sharp and pointed. One is plano-triangular in cross-section and three are biplano with a bifacial bevel at the edge.

Notched end blade -- total 7 (Fig. 16, e, f, h)

Specimens in this group can have either basal or side notches, or both, or incised holes or slits in the body of the end blade. One of these (Fig. 16, e) has two narrow, slit-like notches on an otherwise straight base. The lateral edges are almost straight and converge slightly to a rounded tip. The specimen is thin and has sharp edges and is biplano in cross-section. The remainder of the specimens are fragmentary. One (Fig. 16, f) appears to be a basal fragment with two small side notches and two slits oriented longitudinally on either side of the mid-line of the artifact. Two even more fragmentary pieces appear to be of this arrangement as well. Two other fragments have only parts of the median slits remaining, with no notches. One of these (Fig. 16, h) is large and diamond shaped in cross-section. It has the remains of one oval hole, situated in the median ridge area; otherwise it resembles the triangular end blades described in the previous class. It is also the only one of the notched variety that is too large for a harpoon and blade. The remaining fragment has side notches only and no holes or slits. The small ones measure 28.3 mm in length (only one was complete), 13 to 19 mm in width and about 4 mm in thickness. They would be suitable for harpoon tips and the slits on some may have been used to lash the blade onto the head.

Gravers -- total 6 (Fig. 16, b and c)

These are very similar in shape and type of working edge to burin-like tools, but because they are made from a much softer material, probably were not used to work hard materials such as bone or wood. Their function may have been to crease or crimp hide or skins. All are made of light grey or beige slate.

Only one of these is a complete specimen (Fig. 16, c). It has an oblique base with two small notches, two straight sides that converge to a narrower, oblique and straight distal end. One of the lateral edges also has a small notch near the base. The lateral edges have been ground straight and flat, whereas the distal end has a double, bifacial bevel resulting in a sharp, thin edge. Its maximum length is 20.6 and the width of the base is 24.7 mm. It is also very thin, being only 2.6 mm in thickness. Three fragments seem to belong to this type; they have the same form of lateral and distal edges but the basal areas are missing. On each, however, the vestige of one notch does remain. Another fragment is the distal end of a more rectangular shaped graver, with one small notched on the lateral edge. Both the lateral and distal edges have a double bevel and fairly sharp edges. The remaining fragment is a small area of the distal part only.

Flat, bevelled-edged knives -- total 5 (Fig. 18, l)

These are very thin, flat and large implements. The most complete specimen has a narrow, notched base, straight sides that slightly converge towards the distal end, which has broken off. The lateral edges have a unifacial or single bevel on alternating surfaces resulting in two fairly sharp edges. There are also two small holes or slits about 30 mm up from the basal notches. The length of the specimen is 147.6 mm,

the maximum width is 74.1 mm and the thickness is only 4.2 mm. It appears that the artifact was hafted and lashed to some sort of handle, but it is so thin and delicate that it could not have been used to cut anything very hard. It may have functioned as a skin scraper, but then it seems to be too large and thin for this. Other things that the writer can think of that are soft and that an Eskimo may want to cut are blubber and snow. Concerning the last item, Taylor (1968b:86) has tentatively accepted the presence and use of the snow house in Dorset and these flat, slate knives may have been used to cut blocks of snow for building them. There is also a lateral half fragment of such a knife. It has a similar bevel on the edge and even the remains of a central slit. In thickness, angle of bevel and shape, it is almost the double of the first specimen. Three other bevelled fragments may possibly belong to this class.

Stemmed scrapers/adzes -- total 2 (Fig. 16, g)

These are small, thin specimens that may have been used for scraping skins, or just possibly for delicate shaving of soft wood varieties. Both are more or less similar in shape. The stem is short and broad and the shoulders convex. The lateral edges are asymmetrical, one usually more convex than the other. The distal edge has a single bevel at about a 35 to 40^{0} angle and the surfaces are flat and straight. They are broadest at the distal end where they measure about 21 mm and the base is about 14 mm wide. Both are broken but the length exceeds 22.8 mm. Their thickness is about 2.6 mm.

Miscellaneous bevelled tools -- total 3

One of these is rectangular in shape and tapers slightly toward one end which has a rounded bevel and is convex in shape. It is long and narrow, measuring 71.4 by 12.6 mm and fairly thin at 4.5 mm. This

may have been used as a skin creaser or scraper.

Two specimens are very small and delicate and have rounded, bevelled ends. They have a straight base, are narrow with slightly convex sides and very thin. Their function again is hard to determine.

Ground slate fragments -- total 114 (Fig. 16, a)

There are 11 fragments that seem to belong to the tip ends of end blades. Two of these are sharp and have a double bevel along the lateral edges. The remainder are rounded. Three are made from dark grey slate and eight from beige slate.

Ten are fragments with a notch but they are so small that their affiliation cannot be determined. They could possibly be from side-notched end blades or from notched gravers.

Twelve are mid-section fragments that have both lateral edges present. Their sides may be either straight or tapering toward one end (Fig. 16, a). Nineteen fragments have only one lateral edge present. Eleven of these have a single bevel, six a double bevel and two are ground straight. The remaining 62 fragments are indeterminate and have no special feature. Twenty-eight of these are of whitish to beige slate and 34 are of grey slate.

Ground and chipped slate -- total 4 (Fig. 16, d, i)

Three of these are triangular end blades (Fig. 16, i). Most of both surfaces have been ground, only at the lateral edges do chipping scars remain. They have a plano-triangular cross-section, and the ridged surface has a small, flat facet near the base to make this area thinner. The complete specimen measures 61.8 mm in length, 17.3 mm in width and is 4.5 mm thick. One has the tip area missing, whereas the last is only a tip fragment.

There is also a large, rectanguloid adze or celt that has first been chipped as well as ground. One surface is ground only in the bit area and is convex in longitudinal section. The other surface has three facets ground on the surface. One slopes up from the bit area, the next one extends straight across and the last one slopes down toward the base area. The bit is straight and bifacially bevelled. It is about 78 mm long, 42.7 mm wide and 17.5 mm thick near the mid-point. This implement could have been used for wood working.

CATEGORY 3: SCRAPERS

Two types of scrapers were found at the Cape Bay Light site: end and side scrapers. Scrapers were defined as unifacial implements, at least in the area of the working edge, that had a fairly steep working edge or scraping edge, made by regular parallel flaking. End scrapers are those that have this scraping edge on one or more of the shorter edges of the artifact, and side scrapers those that have the working edge on one or more of the longer sides.

End-of-blade scrapers -- total (Fig. 17, k, l)

These scrapers are made on unmodified blades and microblades, the distal scraping edge being the only retouched edge on the specimens. The scraping edge is slightly rounded with sharp corners. In overall shape, they have a flat base and straight parallel sides. Many have the proximal end broken but the maximum length of complete ones is 28.2 mm. Their width ranges from 7.1 mm to 18.9 mm and their thickness from 1.6 mm to 5.3 mm. These scrapers may have been end-hafted, but there is no lateral retouch or wear in the proximal areas to indicate this. Two of these specimens are made from quartz and the rest from chert.

Quadrangular end scrapers -- total 12 (Fig. 17, j)

These scrapers have generally straight and parallel sides that sometimes contract slightly towards the base which is often straight. The distal and scraping edge is gently convex and has a fairly steep angle. All specimens are unifacial and three have been retouched over most of the dorsal surface, while the remainder have retouch on the dorsal lateral edges only. Their lengths range from 24.1 to 17.8 mm; their widths from 8.7 to 17.2 mm; their thickness from 2.9 to 4.1 mm. All are made from chert.

Triangular, straight edged end scrapers -- total 8 (Fig. 17, h)

These end scrapers are distinguished by their straight scraping edge. As well, they are generally triangular in overall shape, the base being narrow and straight and the sides expanding out towards the distal scraping end. Most have a steep scraping bevel, while two have a thin and narrow angle at the working edge. All are unifacial and only two are retouched over most of the dorsal surface. In length, they vary from 20.2 to 28.3 mm, in width from 15.6 to 18.1 mm and in thickness from 3.8 to 5.8 mm. All are made from chert.

Triangular, rounded corner end scrapers -- total 50 (Fig. 17, g)

These specimens have a symmetrically rounded working end and an overall triangular shape. The distal corners are also evenly rounded. The scraping edge usually has a high and steep angle and is concavo-convex in profile. Eight of these specimens are retouched over the dorsal surface and six have retouch on the ventral surface in the basal half of the artifact. The remainder are unifacial with slight amounts of lateral retouch on the dorsal side only. Lengths range from 16.4 to 38.6 mm, widths from 11.8 to 28.7 mm and thicknesses from 1.8 to 7.2

mm. One is of quartz and the rest are of chert.

Triangular end scrapers with sharp symmetrical corners -- total 237 (Fig. 17,f)

These specimens are similar to the previous group in overall shape. The working edge is slightly to moderately convex and has an angled or sharp corner where it meets the lateral edges. Forty-nine have fine parallel retouching covering most of the dorsal surface, whereas the remainder are only laterally retouched. Twenty-five have been retouched in the proximal area to reduce the bulb of percussion and leave a smooth and flat area, perhaps to facilitate hafting of the implements. These specimens range in length from 15 mm to 34.3 mm. Their minimum width is 10.7 mm and the maximum is 25.6 mm. In thickness, they range from 2.2 mm to 7.3 mm. Twelve specimens are of quartz and the remainder of chert. This is by far the most popular class of end scraper on the site and seems to be a common type in Dorset in general. Although there is some variation in their size, they are fairly similar in shape and nature of working edge.

Triangular, sharp-and-rounded corner end scrapers -- total 12

These seem to be a variant or a combination of classes four and five. The working edge is usually convex and the corners more or less symmetrical. Six have the right distal corner rounded and the left sharp while six are rounded on the left corner and sharp on the right corner. In size, they also fall into the range of the two previous classes. Six have most of the dorsal surface retouched and three are retouched in the proximal area of the ventral surface. All 12 specimens are made from chert.

Triangular end scrapers with sharp asymmetrical corners -- total 64 (Fig. 17, n, o)

These again appear to be a variation on a previous class, this time, class five. Except for the asymmetry of the corners, they resemble that class in overall shape and size. The working or scraping edge is convex and has sharp corners. On 52 specimens, the right corner is more pronounced and more angled where on 12 the left corner juts outward more. Twenty specimens have most of their dorsal surfaces finely retouched whereas 15 are retouched on the ventral surface in the proximal area. In length, they range from 14.7 to 31.8 mm, in width from 11.4 to 26.3 mm, and in thickness, from 2 to 7.2 mm.

Expanding corner end scrapers -- total 32 (Fig. 17, m)

These scrapers are roughly triangular in overall shape, but because of the abrupt expansion of the distal corner, one side is concave in shape. They are all distinguished by having a rather sharp concavity very close to the distal end that makes this corner very sharp and almost a curved beak or spur. This corner may have been used for gouging and perforating in addition to the main function of scraping that these implements seemed to have. Fifteen have this expansion or spur on the right corner, six on the left and 11 on both corners. Most have a rather rough dorsal surface but 15 have been finely retouched on the dorsal side. Six also have retouching in the proximal area of the ventral surface. Three are of quartz and the rest of chert.

Stemmed end scrapers -- total 17 (Fig. 17, e)

These specimens have a broad, convex working end. The lateral edges are slightly constricted for about 1/3 of the way toward the proximal end. Then there is a definite shoulder with downward angled

borders and the proximal part of the artifact is a stem that contracts to a narrow straight base. Some are very definitely shouldered and stemmed while on others the constriction is more gentle. Twelve of these specimens have been carefully retouched over the dorsal surface whereas only four have ventral retouch, which is confined to the proximal area of the artifact. They range in length from 14.4 to 39.2 mm, in width from 14 to 31.9 mm and in thickness from 4.2 to 7 mm. One is of quartz and the remainder of chert. These carefully formed and retouched stems were probably for the purpose of facilitating end-hafting of these tools.

Notched end scrapers -- total 6 (Fig. 17, c, d)

These specimens are generally triangular in shape and have convex, sharp cornered working edges. They also have two broad and well made notches on the lateral edges, generally located in the basal third of the artifact. Four specimens have fine retouching covering most of the dorsal surface, while two are retouched in the proximal area of the ventral surface. The remainder are only retouched laterally. The notches were also probably used to help haft these implements to handles. The largest one measures 43.3 by 30.9 by 7.2 and the smallest one 17.8 by 16.2 by 5.2 mm. Two are of quartz and four are of chert.

"Nipple-edged" end scrapers -- total 13 (Fig. 17, a, b)

On these, the working or scraping edge has a small projection near the mid-point of the edge. This gives the distal end a concave-convex-concave shape. The projection varies from being sharp to rounded. In general shape, these scrapers are triangular and have straight to slightly convex sides. Eight have been retouched over most of the dorsal surface while four also have retouching in the proximal area of the

ventral surface. Since the scraping edge is so uneven, they may not have had this function at all, but may rather have been some type of graver. In length, they measure from 17.2 to 28.7 mm; in width from 12.5 to 23.6 mm; in thickness, from 3.2 to 9 mm. All are made from chert.

Miscellaneous end scrapers -- total 2 (Fig. 17, i)

Figure 17i is a quadrangular shaped specimen with the lateral edges symmetrically concave. Both narrow ends appear to have a steep scraping edge. The artifact is well chipped and retouched on the dorsal surface; the ventral surface is flat and unretouched. It measures 18 by 11.2 by 5.7 mm and is of chert.

The other specimen has a convex working end with sharp corners and lateral edges that expand toward the base. The base is concave and there is a long, narrow flute on one surface from the base to the distal end. This flute is reminiscent of basal thinning in triangular end blades and, indeed, this scraper looks as if it is a modified end blade. It is also biconvex and bifacially retouched. It measures 25 by 22.2 by 6 mm and is made from chert.

Random form flake end scrapers -- total 46

These specimens are generally triangular or rectanguloid in shape, but very rough and irregular. All have a scraping edge of sorts and generally this is convex in shape. Forty-two are chert specimens and are made from thin, flat flakes. The four quartz specimens are much thicker and made from nodules of quartz crystal. The chert ones have an average thickness of 2.2 mm while the quartz ones average at 9.2 mm.

Blanks for end scrapers -- total 15

These specimens are triangular or rectangular pieces that have

some lateral edge shaping but do not have a scraping or working edge present. They are unifacial and plano-convex in cross-section and generally resemble typical end scrapers in form. Three of these are of quartz and 12 of chert.

End scraper fragments -- total 58

There is one medial fragment and 57 basal fragments in this group (most of the distal fragments have been included in the previous classes). The bases are straight to concave; the sides expand moderately from the base. Most of these fragments appear to be from triangular specimens. Six are retouched on the dorsal surface and four on the ventral. Seven are quartz fragments and the remainder are chert.

Concave side scrapers -- total 13 (Fig. 18, d to g)

These side scrapers are made on narrow microblades that are triangular in cross-section, or have one dorsal arris. This has produced implements that are long and narrow and have as their proximal end the striking platform of the microblade. They are also unifacially retouched, usually carefully, over most of the dorsal surface.

Five of these have the concave scraping edge on the left lateral edge, and three have more than one scraping concavity. Four have the concave scraping edge on the right side and have only a single concavity. Two have scraping concavities on both sides. These concavities are not quite opposite each other but overlap a bit. One of the double sided ones also seems to have more than one scraping cavity on one side. One specimen is a mid-section fragment with part of a concave scraping edge present but cannot be oriented as to left or right, proximal or distal. The one complete specimen is 30.1 mm long. In maximum width, they average about 7 mm. Three specimens are of quartz and the rest are of chert.

There is also a small flake that has a well retouched concave scraping edge (Fig. 18, g). This specimen may be a spokeshave.

CATEGORY 4: BLADES AND MICROBLADES

Plain and retouched microblades -- total 886 (Fig. 19, a to i)

No justification was found to separate the artifacts in this category into blades and microblades. Taylor (1962) has used width to separate blades from microblades. In his Arnapik sample, he found that the distribution curve of width was bimodal and separated around 11 mm, and he suggested that blades smaller than that be termed microblades and those wider be called blades. This did not seem to occur with the Cape Ray microblades. Width ranged in a more or less unimodal curve. Wyatt (1970:100) found similar results in his analysis of several Arctic Small Tool tradition samples as well as with other microblade samples, from North America, including Dorset.

Sanger (1970:106) has pointed out that, rather than define the artifact on formal characteristics, it would be more useful to use criteria that describe the technological process involved in the production of microblades. He then suggests that core preparation and the successive removal of blades from the core face be used to evidence the presence of a microblade industry in a complex. His criteria that more than 25 percent of the sample of microblades be non-triangular to indicate removal of successive blades is certainly met by the Cape Ray microblades, where this percentage is about 41. Another feature used to separate true microblade production from pseudoblades and linear flakes obtained fortuitously, is the presence of core face preparation detritus, including several varieties of ridge flakes, cortex flakes and fragments

from the fluted core face. These result from preparing fresh working areas on the core to help control the removal of the microblades. The Cape Ray sample also abounded in material of this sort which will be described at the end of this section.

As for the end product of this technology, the microblade, it may then be defined as a parallel sided flake with a prepared striking platform and/or prepared platform edge, with one or more straight dorsal ridges parallel to the lateral edges. These artifacts will be arbitrarily termed microblades, rather than blades, in the present work, because they tend generally to be small.

The total sample of microblades from the Cape Ray Light site numbered 886. Of these, 736 are of chert, 141 of quartz and nine of other unidentified lithic material. These last nine are not included in the analysis. One hundred of the chert microblades have previously been analysed and reported on in the literature (McGhee 1970). This group of 100 was also not included in the present analysis. It may be useful to use this sample to compare results between a small and large sample from the same site as well as aid in dealing with the problem of observer error. The sample that was analysed by the author consists of 636 chert and 141 quartz microblades.

All attributes, except that of retouch, are similar to those used by McGhee (1970), and the author's results of the measurements of the metric attributes have been arranged in tabular form similar to those presented by McGhee, so direct comparison can be made between the two studies (Tables Eight and Nine). McGhee did not include any quartz microblades in his analysis, but the author has presented data on this type as well, even though we may not be able to assess the significance of variation between the two material types. The faceted shape of raw

TABLE 8

METRIC ATTRIBUTES OF MICROBLADES

	Cape Ray Light Site			Pittman Site		
	Chert	Chert[1]	Quartz	Chert	Chert[1]	Quartz
Width (w)						
Number	636	100	141	107	75	51
Range (mm)	1.0-19.4	6.0-11.0	2.4-10.7	1.0-23.3	4.5-11.0	3.7-14.9
Mean (mm)	8.93	8.64	6.31	9.97	8.35	6.34
s.d.	2.2	1.29	1.73	3.58	1.47	2.32
c.v.	25	15	27	36	18	36
Thickness (T)						
Number	636	100	141	107	75	51
Range	0.89-6.1	1.4-4.5	0.8-3.6	.8-6.7	1.3-3.8	1.0-3.19
Mean	2.44	2.37	1.85	2.46	2.35	1.73
s.d.	0.68	0.57	0.52	0.83	0.58	0.49
c.v.	28	24	28	33.5	25	29
T/W index						
Number	636	100	141	107	75	51
Range	8.5-31.9	16-46	14.5-62.5	10.5-28.7	13-49	9.4-48.6
Mean	29.1	28.1	30.44	27.2	28.4	29.1
s.d.	18.31	5.72	8.71	14.80	6.66	8.10
c.v.	62.9	20	29	54	23	27.8
Length-complete						
Number	69	14	30	2	3	7
Range	14-8-60.7	26.2-45.5	14.7-38.4	40.8-41	21.5-35.2	18.8-27.6
Mean	33.86	35.79	23.31	40.89	30.60	21.72
s.d.	11.4	5.33	5.2	--	--	3.01
c.v.	34	15	22	--	--	14
P Angle						
Number	372	54	80	48	30	20
Range	45-140	55-105	65-115	45-100	55-95	50-95
Mean	82.79	78.61	82.02	80.41	77.33	75.0
s.d.	10.8	10.87	7.6	10.51	9.84	12.13
c.v.	13	14	9	13	13	16.2
LR Angle						
Number	636	100	141	107	75	51
Range	20-125	30-115	20-130	15-115	40-120	25-105
Mean	67.51	71.30	64.53	52.57	72.33	48,52
s.d.	18.2	20.15	21.2	16.75	15.35	16.89
c.v.	27	28	33	31	21	35
Arris Number						
A 1 (%)	35.8	28	46.1	51.88	33	82
A 2 (%)	55.8	65	48.9	46.2	61	18
A 3 (%)	7.89	7	4.9	1.9	5	0
A 4 (%)	0.47	0	0	0	0	0

[1]Sample analysed by McGhee (1970, Table I)

TABLE 9

BREAKAGE CHARACTERISTICS OF MICROBLADES

	Cape Ray Light Site			Pittman Site		
	Chert	Chert[1]	Quartz	Chert	Chert[1]	Quartz
Length (1)						
Number	636	100	141	107	75	51
Mean (mm)	25.48	28.97	18.92	18.25	23.25	14.54
s.d.	8.9	7.72	6.1	5.79	6.55	6.45
c.v.	35	27	32.4	32	28	40
L-proximal frag.						
Number	43	49	40	48	45	43
Mean	26.41	29.81	18.78	18.39	24.65	15.38
s.d.	7.57	7.8	6.2	4.91	7.45	6.83
c.v.	28	26	33	27	30	44
L-medial frag.						
Number	28	23	25	38	33	35
Mean	20.7	23.64	15.41	17.02	21.58	13.97
s.d.	6.7	4.38	4.4	5.02	5.25	5.87
c.v.	32	19	29	29	24	42
L-distal frag.						
Number	10	14	13	11	17	6
Mean	24.15	27.99	18.93	18.04	21.12	18.43
s.d.	9	7.41	5.9	4.53	3.42	6.73
c.v.	37	26	32	25	16	37

[1]Sample analysed by McGhee (1970, Table 2)

quartz crystals may influence the shape of the cores made from them and hence the size of microblades produced. Also sizes of available raw crystals may be reflected in sizes of microblades.

The definition of attributes has very closely followed that which is outlined in Appendix I of the above report (Sanger, McGhee and Wyatt 1970). The divergence or the difference that occurs between the results of the two studies could be due to two causes. One is the great difference in size of the two samples and the other is observer error. In the present study, students with varying amounts of experience in the analysis of chipped stone did the measuring and the assessment of non-metric attributes. Size attributes were taken to the nearest 1/10 mm and angles measured to the nearest 5^{0}. The observer error in these attributes is probably small. Platform preparation and retouch features are more difficult to assess by the inexperienced eye, so these have been simplified and changed from the original analysis by McGhee, and, therefore, cannot be compared directly to his results. These will be discussed later.

A few comments are in order concerning the results in Tables Eight and Nine. Comparing the two analysed samples of chert microblades from the Cape Ray Light site, we find that as the size of the sample increases, the size of the variation of the width, thickness, the T/W index (thickness x 100, over width) and the length of complete blades also increases (Table 8). This is consistent with McGhee's interpretation of the variation of these attributes within Dorset culture in general. He states that with the exception of the platform angle (P angle), all other attributes exhibit a relatively high degree of variability (McGhee 1970:91). The sum of the angle of the left and right lateral edges (LR angle) is almost identical in variation between the two samples.

The variation within each sample, however, is high and this again is an attribute that varies considerably on Dorset microblades. The platform angle has a low degree of variation and the increase in the size of the sample does not seem to affect this very much. The distribution curves for all the above attributes are more or less unimodal and approach normality very closely. This indicates that we are probably dealing with one cultural tradition, either of short duration or fairly conservative in nature. The number of dorsal ridges or the arris number is also presented in Table Eight. This shows that the percentage of triangular chert microblades, those with one arris, is about 32 for the entire sample, whereas that of non-triangular ones, those with two or more dorsal ridges, is 68. This ratio is well within the Sanger's requirements to show that a true microblade industry is present.

Table Nine outlines the figures for lengths of broken microblades. In the entire sample of 736 chert microblades, 83.5% are broken and 16.5% are complete. This high degree of breakage also characterizes other Dorset microblade assemblages (McGhee 1970:91). Proximal fragments far outnumber medial and distal fragments, but the degree of variation, c.v., of the length of all fragments is high, between 28 and 37. This seems to indicate that microblades were not broken to achieve a uniform length so that they could be hafted into handles or shafts of the same type. It's more probable that they either broke by accident or they were broken in a variety of lengths to match the variety of other artifacts that were to be made from them, or match the variety of functions that they may have had.

McGhee (1970:92) also points out an interesting feature about the lengths of broken microblades. This is that the mean length of proximal fragments combined with the mean length of distal fragments is much

greater than the mean length of complete microblades. This is also true of the large sample of Cape Ray microblades. The question then becomes: where are the much smaller fragments to match proximal and distal ones to produce blades within the mean length of complete blades? He suggests that they are so small that they evade recovery. To this I would add that, even though they may be recovered in the field, they may not be recognized in the laboratory and included in the category of detritus chips.

The attribute of microblades made from quartz crystals tend to be rather similar to the chert ones, especially as concerns the measures of their standard deviation and coefficient of variation. However, they tend generally to be smaller. The means for width, thickness and length are less than for their chert counterparts. This is probably governed by the size of the raw quartz crystals that were available for use as microblade cores. They also seem to be broken in a similar fashion as the chert ones and the length of proximal and distal fragments exceeds the mean lengths of complete specimens. The number of dorsal ridges and the sum of the angles of the left and right lateral edges follow the chert sample fairly closely. It is in the platform angle that a major difference appears. Although the mean of this angle is the same as that of chert microblades, the amount of variation, both in the range and the coefficient of variation, is considerably less. This again probably reflects the limits imposed by the form and size of the raw quartz crystal on core shape.

The following modification characteristics were also analysed: platform preparation, end retouch and lateral edge retouch. Platform preparation included both alterations to the top surface of the platform

itself as well as extensive battering and roughening of the platform edge, as this latter type of preparation resulted in some alteration of the top surface as well. On this basis, all striking platforms present in the sample, both chert and quartz, showed preparation. Of the 342 chert platforms, 98% were modified by battering or flaking and 2% showed some grinding. All 86 platforms of quartz crystal microblades were battered and/or flaked. Platform preparation by flaking seems common on Dorset microblades. Grinding of the platform does occur on microblades but not on cores in the Cape Ray sample. The ground microblade platforms were examined personally by the writer. The grinding is only minimal and does not obliterate the previous battering and chipping and occurred on only eight of the chert microblades.

Determining deliberate retouch was a much more subjective operation than those carried out above. Retouch was rather loosely and arbitrarily defined as any regular chipping to modify the borders or edges of an artifact that could be seen by the eye alone. It is also understood that the amount of chipping has to be more than merely one or two scars, before it could be considered as retouch.

On this basis the proximal and distal ends were first examined for retouch. At the proximal end, retouch was differentiated from platform edge battering by the presence of regular, even chipping, the purpose of which was to smooth out any roughness resulting from the battering that was present or to thin the proximal end by reducing the bulb of percussion. Thirty-six chert microblades were retouched on the ends, 68% across the proximal end and 32% across the distal end. Of the quartz microblades, a total of 18 were retouched in these areas, 47% across the proximal end and 53% across the distal end. The type of retouch also varied, as did its quantity. Most of the working of these

edges seemed to smooth out irregularities for hafting purposes.

Similar problems were encountered when analysing retouch along the lateral edges. To make the assessment of the retouched area fairly simple, a combination of letters indicating location was employed. This also follows the scheme employed by Sanger, McGhee and Wyatt (1970). The manner in which the results were interpreted and combined, however, differs somewhat from that used by McGhee (1970).

Within the total sample of both chert and quartz microblades, but excluding those examined by McGhee, 209 microblades had some type of lateral edge retouch. This is approximately 26% of the sample. The location of retouch was divided into five classes. The first of these consisted of retouch on alternating surfaces, i.e. one edge on the dorsal surface and the other on the ventral. This type occurred in a total of 29 microblades. This type of bilateral retouch was reported by McGhee to be the most common type, especially when it occurred in the proximal area of the microblade (McGhee 1970:95). He termed this form "proximal tangs." This is not the most common type of retouch in the Cape Ray Light site. Seventy-one microblades are retouched bilaterally on the same surface, 12 of these on the ventral surface and 59 on the dorsal surface. Eighty-four are retouched unilaterally on one surface only, the most frequently on the dorsal surface with 38 on the left edge and 31 on the right edge. The remaining two classes of retouch involve bifacial retouch of at least one edge. Eight are retouched bifacially on one edge only, two on the left and six on the right. The remaining 17 microblades in the retouched category have one lateral edge bifacially retouched and the other with either unifacial dorsal or ventral surface retouch. The total of blades with unifacial retouch, or retouch entirely

confined to one surface, is 155 and those with retouch on both surfaces, or bifacial retouch is 54. This would seem to confirm McGhee's observation that retouch had mainly an edge blunting function, especially if it is taken into account that of the bifacial group only 25 were bifacial along the same side. No separation of the Cape Ray microblades into chert and quartz was made during the analysis of retouch as material did not seem to have any bearing on the retouching of the artifact.

Microblade ridge flakes, core face detritus and preparation material -- total 1006 (Fig. 19, j to p)

In the Cape Ray sample, there was material that was closely related to the technology of microblade production. This included ridge flakes, both of the primary and secondary type, fragments or detritus of the fluted face of microblade cores and long narrow triangular flakes with at least one dorsal surface covered by cortex, which were probably the result of preparation or shaping of the core prior to true blade removal. None of these can be considered as deliberately made artifacts, though some of them do exhibit retouch on the lateral edges. Because they are an essential part of the microblade manufacturing process, they will be described under the category of microblades.

Ridge flakes were divided into primary and secondary types, based on the description presented by Sanger (1968:196-198). Thus, primary ridge flakes are linear, parallel side flakes, triangular in cross-section and with the dorsal surfaces covered by flaking scars perpendicular to the long axis of the flake. The dorsal ridge, itself, exhibits crushing and battering, as it formed the striking platform from which the transverse flaking originated. The apparent purpose of this type of flaking was to prepare the face of the core into a series of regular

fluted facets and parallel ridges. After a ridge was prepared down the length of the core face, it was removed by a blow at the appropriate place on the striking platform. This would then produce a primary ridge flake as well as a long, smooth scar with two lateral parallel ridges on the core face.

Primary ridge flakes, which tend to be quite narrow, probably did not remove all of the scars of transverse flaking and if flakes continued to be removed beside the original, these would also exhibit varying amounts of transverse flake scars on their dorsal surfaces. These Sanger has termed secondary ridge flakes. These do not have the battered dorsal ridge of the primary flake and are usually much thinner. They are triangular in cross-section and have at least one dorsal surface covered by transverse flake scars, while the other is often a long, smooth flake scar resulting from the removal of a previous blade or ridge flake. Secondary ridge flakes may further be divided into A and B forms. The A form is a flat, thin and fairly broad flake, usually with only a very narrow, longitudinal scar on one dorsal surface. The B form is narrower and thicker and has a much more definite triangular cross-section and a much wider longitudinal blade scar along one dorsal surface. The difference between the two forms of secondary ridge flakes reflects the steepness of the primary ridge and the extent of the transverse flaking in the formation of the ridge, as well as the nature of the removal blow at the striking platform.

In the Cape Ray sample, there are 20 primary ridge flakes (Fig. 19, n, o). Three of these are quartz and 17 are made of chert. The presence of quartz ridge flakes indicates that even though the quartz crystals, which formed the raw material for quartz cores, were already facetted and ridged in their natural state, the core face had to be further

prepared and modified before acceptable microblades could be obtained. The length of complete primary ridge flakes is very close to and exceeds the length of the longest complete microblades. This may indicate that the core face was prepared in this manner at the start of a new core and was not often used to produce new ridges once the successful removal of true microblades had started. The striking platforms of primary ridge flakes are all prepared by chipping and battering and the platform angle has a mean of 85^{o} or slightly more than that on the microblades. None of the primary ridge flakes had been retouched, nor do they appear to have been used.

Secondary ridge flakes were much more frequent than primary ones. There were 271 of form A (Fig. 19, l and m) and 236 of form B (Fig. 19, j and k). Four of the form A flakes were quartz, none retouched. Of the chert flakes, 83 were retouched, usually on the lateral edge that already had transverse chipping scars, as if the purpose of the retouch was to remove the jaggedness of some of this chipping. These retouched flakes could be used as simple cutting implements. In the category of form B ridge flakes, 24 were of quartz, four of these retouched. Also, 46 of the chert form B ridge flakes were retouched or heavily used. The type of retouch and use seemed to be similar to that on the form A secondary ridge flakes.

There is another category of flakes that does not fit either primary or secondary ridge flakes, because they lack transverse flaking on the dorsal surface, nor are they true microblades, because one of the dorsal surfaces of these triangular flakes is extremely steep, often approaching 90^{o}. These were termed steep-edges flakes. Since one dorsal surface of these flakes has a longitudinal scar resulting from the removal of a microblade or ridge flake, these flakes are part of the

process of microblade manufacture or core face modification. There is a total of 160 of these, 36 of quartz and 124 of chert. Thirty-eight of these are retouched, unifacially, on one or both lateral edges, and again these were probably used as simple cutting implements.

There were also 65 linear, parallel sided flakes that had one dorsal surface covered with cortex (Fig. 19, p). Fifteen of these were quartz. They form a category of detritus, resulting from the initial trimming of the chert nodule or quartz crystal from which the core was made. Again, some of these have been retouched and used as tools.

The remaining group of material connected with microblade and core production consists of large fragments and irregular shatter from the fluted surface of the core. This was termed core face detritus. The sample contained 254 pieces of this type of detritus, 54 of quartz and 200 of chert. These detritus fragments all had one surface with at least two parallel dorsal ridges that remained after microblade or ridge flake removal. Usually, these dorsal ridges were irregular, interrupted or angled towards each other. The fragments of core face detritus seem to represent large areas of the core face that were removed because good microblades could no longer be produced. Their removal left a fresh surface on the core that could now be set up for further blade production. Others seem to be merely the result of accidents of flaking the core. They sometimes consist of a large amount of striking platform, part of the curved and battered edge of the core and remains of the polyhedral, fluted core face.

In summary, the Cape Ray microblade technology is characterized by the following: the use of both chert and quartz as well as very occasionally unidentified macrocrystalline rocks as raw materials. Chert is by far the most popular medium. In size, that is for the width,

thickness, length and T/W index, they generally resemble other Dorset microblade complexes across the Arctic (McGhee 1970). No comparable data is available for quartz microblades but they generally tend to be smaller and thinner than the chert ones. This is probably due to the size of raw material available for cores. Both chert and quartz microblades from the Cape Ray Light site resemble other Dorset complexes in platform angle, the angles of the left and right lateral edges, as well as in the percentage of numbers of dorsal ridges present. The same statement of general similarity may also be applied to the manner of breakage of microblades. There are many more proximal fragments comprising from about a third to a quarter of the sample. The mean of the length of all types of fragments is approximately equal, though the variation in each, especially the distal fragment category, is great. This seems to indicate that no single type of fragment was chosen over the others for use as a tool or as a blank to make a tool.

Unifacial retouch along the lateral edges occurs much more frequently than bifacial and probably indicates that the purpose of retouch was to blunt the edges to facilitate hafting rather than to produce a sharp edge. As far as can be determined, from the fragments, this type of edge retouch tends to be in the proximal areas of the blade, and seldom reaches along the entire length. Based on this, microblades in this sample were much more frequently end-hafted than side-hafted when used as tools.

The presence of many ridge flakes, cortex flakes and core face detritus indicates that much care was taken to ensure the production of successful microblades by means of preparation of the core and eradicating mistakes and irregularities from the core face. This preparation was carried out on both quartz and chert cores. The fact that some of this

core preparation detritus was retouched and used indicates that all tools did not have to conform to traditional shapes and sizes, but any piece that was suitable could be used as circumstances dictated.

CATEGORY 5: CORES

Conical microblade cores -- total 3 (Fig. 20, l)

These cores have a roughly flat striking platform from which the fluted core faces converge to a very short ridged or a pointed base. The sides are slightly convex and at least two of them have evidence of microblade scars. The platform has been formed by means of large, shallow flaking and there is some evidence of battering along the platform edge. The platform angles for the three cores are 70^{0} and 85^{0}. They vary in length from 24 mm to 37.8 mm and in diameter from 13.3 by 24.7 mm, to 13.5 by 14.3 mm. The width of the microblade scars range from 2 to 6 mm. Two of these cores are of chert and one, the smallest in the group, is of quartz.

Triangular microblade cores -- total 7 (Fig. 20, d, i, j, k)

These have a narrow, rectangular striking platform, with the microblades removed from the narrow edge or the narrow axis of the platform. The platform is flat and has been formed by flaking. Six of these specimens have been made from quartz and one from chert. The angle that the platform makes with the fluted core surface on six quartz specimens ranges from 55^{0} to 60^{0} and the mean is 55.7^{0}. These quartz crystal cores are also very short in relation to their breadth. The largest one is 36.5 mm long and 30 mm broad and 15 mm wide. One quartz specimen has microblade removal scars on both narrow surfaces, while the others have blade scars on only one surface. Cores with the two converging sides

utilized, have been reported by Knuth (1954:371) from the Independence I culture from Greenland and by Taylor from the Tyara site in northern Ungava (1968b:64 and Fig. 27, k). Both of these writers refer to them as double or double-ended cores, but since only one platform is present and in shape they resemble single surface triangular cores, the present writer prefers to include them as a variety of this class. The other two surfaces are straight and flat, with only an occasional shallow flaking scar present. The chert specimen varies slightly from the quartz cores. Its platform angle is 70^{o} and it is much longer in relation to its breadth. Its length is 32 mm and its breadth is 17 mm.

In several respects, these triangular cores approach the type sometimes termed wedge-shaped. As defined by Morlan (1970:18) they "have elongated platforms, but the fluting chord is in the short axis of the platform and the flutes are marginally distributed. The broad faces of the specimen are irregularly flaked, and the margin opposite the fluted surface may form either a wedge or a flat surface of some kind." The above specimens certainly fit these criteria, but so do the specimens that are described in the next section, under rectangular cores. At this preliminary stage of analysis of Dorset core technology, it is probably best to keep the triangular and rectangular forms separate, but Newfoundland Dorset material has wedge-shaped cores as an important part of its inventory.

Cuboidal or rectangular microblade cores -- total 9 (Fig. 20, b, e, f)

As already suggested, this category resembles the preceding one. Its main differences are that the shape of the core is definitely cuboidal, i.e. it has more or less straight sides that meet at approximately right angles, and the platform angle is much closer to 90^{o}. The surface of

the platform is flat and the opposite surface or the base of the core is also flat or slightly rounded by irregular chipping and battering. The significant features about these cores, as related to Morlan's st ment is that the shape of the striking platform is an elongated and narrow rectangle and the microblades have been removed along the short axis of one side of this platform only.

Four of these are of chert and five of quartz. The chert ones tend to be larger with maximum length of 53 mm and striking platform dimensions of 33.2 by 16 mm. They also have the widest microblade scars present, two of these being about 8 or 9 mm wide. The largest quartz one is 35 mm long and has a platform that measures 33.2 by 16 mm. The microblade scars on the quartz cores vary from 2 to 7 mm in width.

Double platform microblade core -- total 1

This clear quartz specimen is very small and almost cuboidal in shape. It is 15.9 mm long and measures 15.1 by 10.8 mm in diameter. One of the striking platforms is flat and rectangular with two microblade scars extending from it. These measure 7.5 and 4 mm in width and the platform angle is 85^{o}. The other striking platform is directly opposite and is smaller, irregular and somewhat ridge shaped. Its platform angle is 65^{o} and there are four microblade scars extending from it, that are much narrower, averaging only 2.7 mm in width. This core has two separate fluted faces, both of them being on the broad surfaces of the core and slightly convex, converging toward the smaller striking platform. As far as the writer is aware, double platform cores are very rare in Dorset.

Ridged platform microblade cores -- total 2

These specimens may not yet represent cores in their finished

form but rather may be at one stage in the preparation of microblade cores. Both of them are of quartz and they retain much of the natural, facetted surface of the raw crystal. Two or three elongated flake scars extend from the pointed, free end of the core. This fluted surface usually extends along one of the facets of the crystal and does not reach the bottom of the core. The platform was not prepared, being merely a sharp pointed ridge showing some battering. These have a mean length of 23.5 mm and measure 12.4 by 11.4 mm at the base. The fluted surface extends for about 2/3 of the length and the scars are very narrow, being from 1.5 to 2.1 mm in width. These crystal cores may also have some connection with the top worked or flaked crystals to be described later (see class eight below).

Random form microblade cores -- total 21

These cores are characterized by an irregular, multi-faced, squarish outline with a minimum of shaping and platform preparation. One surface is fluted with at least two microblade scars present. The platform angles are close to 90^{0} with a few being less than that. Four specimens are of chert and their mean measurements are 33.8 mm in length, 13 mm in thickness and 37 mm in width. The remaining seven are of quartz and tend to be somewhat smaller. They range from 22 to 35 mm in length and 15 by 19 mm to 7 by 9 mm in width and thickness. Their shape could best be described as squarish or rectangular.

Microblade core fragments -- total 30

These differ from core face detritus by the fact that they retain much of the striking platform and are thick, chunky fragments rather than thin flakes. All fragments retain at least two microblade scars. Eighteen specimens are made of quartz and their striking platforms range

from 65^0 to 75^0. These seem to originate from small cores as the remnant scars do not measure beyond 5 mm in width. The 12 chert fragments show more variation in platform angle, one cluster being around 90^0 and the other at 65^0. They also have wider blade scars, with several being 8 or 9 mm wide and others averaging at 4 mm and are comparable to the chert fragments.

Blanks for microblade cores -- total 16 (Fig. 20, g and h)

This group consists entirely of quartz crystal. Four of these have been flaked at the sharp free end of the crystal either bifacially or unifacially. The flaking has resulted in a straight, sharp ridge. This may either have formed the basis for a striking platform, or, since the shape of this end of the crystal is in the form of a chisel or wedge, these may have been tools rather than blanks for cores.

The remaining 12 are raw quartz crystals. They range in size from 63.6 mm in length and 41.4 mm in diameter to 24.7 mm in length to 5 mm in diameter. It is also possible that their purpose could be other than as blanks for blade cores. Their greatest use potential, however, seems to be as raw material for the making of microblades.

Flake cores -- total 76 (Fig. 26, c to e)

Since these cores do not conform to one form or shape, it was rather hard to isolate this material from shatter and roughly flaked nodules. The minimum criteria for defining a flake core were the presence of a definite striking platform and/or the removal of flakes in some regular way from one or more surfaces. Since these cores are also so amorphous in shape it was hard to separate complete core from fragments and no attempt was made to do so. Hence this group contains a certain number of fragmentary cores. As a group flake cores may be described

as follows: they are irregular in shape. Flakes have been removed in more than one direction, but at least two from the same platform and adjacent to each other. The few platforms that showed preparation were flaked with some edge battering. In many cases the cortex surface or the surface formed by a flat break was used for the striking platform. Platform angles tend to be close to 90^{0}, though some are less at 75^{0}. The longest flake core measures 62.5 mm by 60.2 mm.

Sixteen of these specimens were found piled together in one tight concentration in the occupation layer of trench two, Area F (Fig. 26, c, d, e). Some of these had already been utilized as cores while others seemed to be blanks for cores. They were all of multi-coloured chert, the largest measured 68.7 by 37.6 by 40.4 mm and the smallest was 52 by 27.5 by 18.3 mm. There was some charcoal in the soil surrounding this cache, though not enough to represent concentrated burning. The possibility remains, however, that these cores may have been placed together for the purpose of heating before chipping to make the material more malleable and easier to work.

Flake core ridge and edge flakes -- total 31

These are all large, roughly worked thick flakes, and although some resemble microblade ridge flakes, they seem to be too large and irregular to be included in that category. Twenty-five of these seem to be core face detritus flakes. They have part of the striking platform and the battered edge of the platform still present, as well as several flakescars. They are all of chert.

Six are roughly triangular with a sinuous ridge formed by transverse flaking and a smooth ventral surface. Their mean width is about 20 mm and their thickness about 1.5 mm. The transverse flaking consists

of two or three large shallow flakes removed from each surface. All are again made from chert.

CATEGORY 6: SOAPSTONE

A total of 672 artifacts and fragments of soapstone was found. Of these, only 203 pieces were found to be useful in contributing to a description of the soapstone industry at the Cape Ray Light site. Of the remainder, 352 were small and plain fragments. These fragments had two finished surfaces, and from this feature, it's probable that they were parts of rectangular vessels. The only useful attribute that they might contribute is a measure of thickness, but since their location on the vessel is not known, this measurement alone is not very informative. One hundred and seventeen fragments were so badly eroded or broken that they could not even be measured for thickness. Some of these may also have been detritus left over from the manufacturing process but this also was hard to decide with these pieces.

The analizable pieces were divided into rectangular vessels, triangular and rounded vessels, miscellaneous pieces, and specimens with patching, suspension or manufacturing features.

Rectangular vessels -- total 157 (Fig. 21, a to d)

The class of rectangular vessels was the most numerous. Including some miscellaneous pieces and the 27 specimens described in the last class, they comprised about 94% of the analyzable pieces. Based on the few vessels that were complete enough to give an idea of overall size, the sample was divided into large and small vessels.

Before a description of the specimens in the rectangular category is given, a definition and description of the attributes used in their

analysis will be outlined (see also Fig. 21A). Dimensions will be given as the maximum for a certain feature, unless the variation seems to be great enough to be significant. Thus, if the height of a side varies because of imperfections in manufacturing, the maximum height will be given. If the variation is deliberate, that is the lip is not horizontal or straight, then such a variation will be described separately. The dimensions measured were those of the base, usually on the exterior of the vessel, but sometimes on the interior if the exterior surface was badly eroded. The thickness of the base is given as the maximum. The height of the sides is taken along the surface on the exterior, rather than the perpendicular distance from the base. Since the sides usually slope outward, there is a difference between these two measurements. Since the slope is usually not too great, being less than 35^{0} and since only the surface distance can be measured on rim fragments with no bases, this surface measurement of height of vessels proved to be more useful as minimal depths of rim fragments could also be used. The sides sometimes tapered or thinned toward the lip and hence two figures for side thickness are given; one at the base and the other at the lip, whenever possible.

Further to describe the form of the vessels, two series of angles were used. One was the horizontal angles of the basal corners. These were used to indicate the basal and overall shape of the vessel. The other was the angle of the slope of the sides from the perpendicular. Since a majority of vessels seemed to have one side sloping outward more than the others, this turned out to be a significant attribute of vessel form. A third possible angle is that of the slope of the corner itself from the perpendicular, but it was not found to be useful, as this angle is made up of the angles of the two sides that make up the corner. This

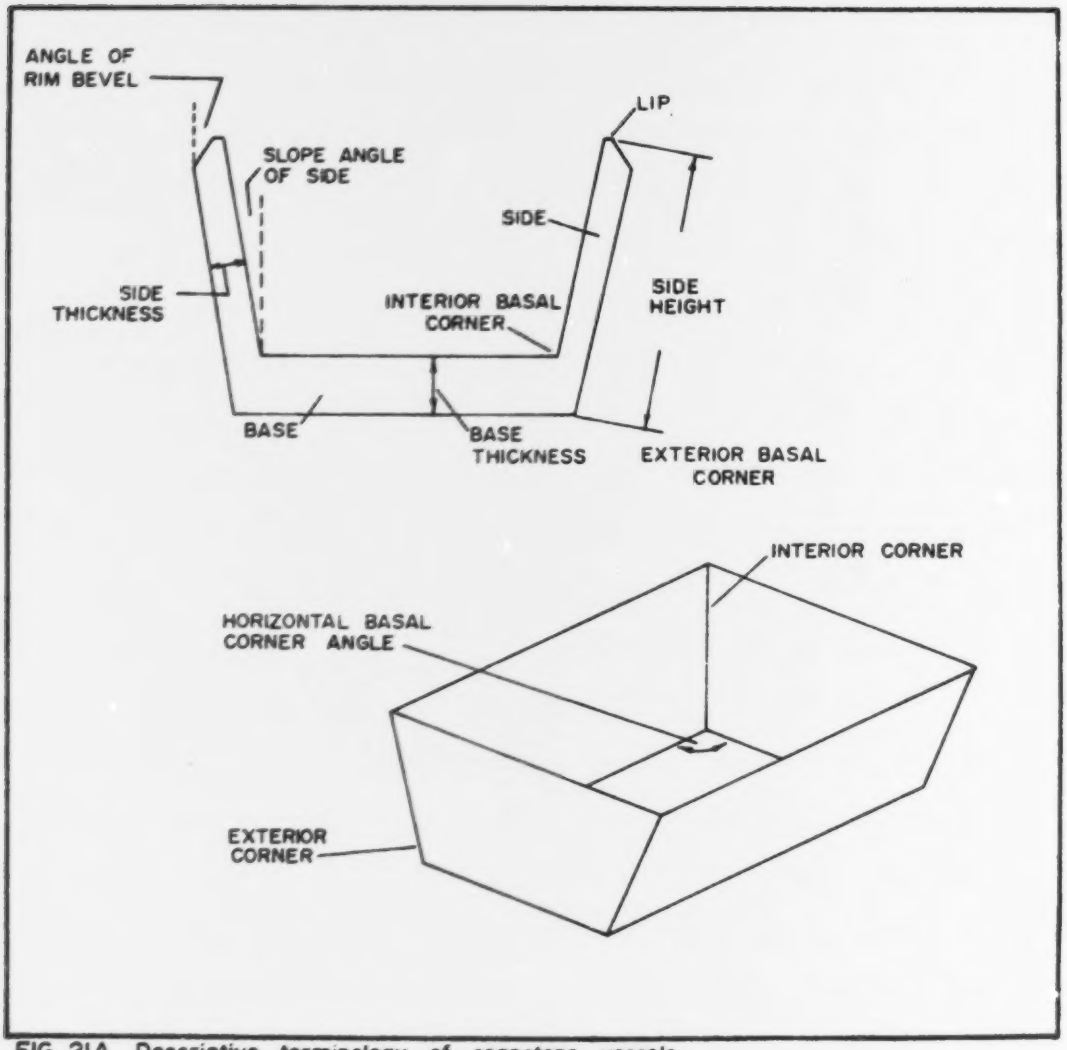


FIG 21A Descriptive terminology of soapstone vessels

angle has not been presented.

Several attributes concerning the manufacturing of the vessel wer also considered. One of these was the configuration of the internal and external edges of the corner and basal angles. These were either sharp, usually in the interior of the vessel, or, as was common on the exterior, were truncated or gently rounded. Frequently there was a bevel on the exterior surface of the rim. This is referred to as the rim bevel. The lip, or the top of the rim is usually very thin, flat and straight. In a few cases, the rim bevel is missing and the side merely tapers in a gentle curve to a rounded lip. The rim may also have a double bevel, both on the interior as well as on the exterior, but this was very rare.

The rectangular vessels will be described according to broad size categories. These categories, large and small, may not represent functionally significant units, as the numbers of whole or almost whole vessels is very small in the sample. Therefore, they will be used as arbitrary analysis classes only.

None of the large vessels is complete. The most complete one (Fig. 21 a) has part of the base, two corners, parts of all four sides and one of the sides with a short rim area present. This vessel is the largest in the sample. The base measures 178 by 143.8 mm on the exterior and the height of the one complete side is 169.4 mm. The thickness of the sides, at the base, varies from 10.2 to 20.4 mm, whereas the base itself is 12 mm thick. From the small area of complete rim, it seems that the exterior bevel is about 20 mm long and slopes by about 8^{o} from the exterior surface. The lip is flat and horizontal and is 3.5 mm wide.

The slopes of the four sides are 13, 18, 17 and 30^{o} respectively, from the vertical. This vessel, therefore, has one side sloping outward

much more than the other three sides. The horizontal, basal corner angles are both near 90°.

The exterior corner and basal edges have a flat narrow bevel, while the interior corners meet at sharp angles. The vessel is smooth and well finished with no patching holes or any manufacturing features present. It has a heavy carbonized crust on the exterior near the rim, and not much at the base. This encrustation may have been deposited after the vessel had broken in a cooking and hearth area, though it was not found in a hearth.

Six specimens, less complete than the above, seemed also to belong to the larger variety of vessel. Not all dimensions could be measured on each and, for some, only minimum figures can be given. One vessel with a complete base and side measured 79 mm in width, 136.8 mm in length and 113.5 mm in height. On vessels with incomplete bases and sides the minimum length was 101.2 mm, the width 72.1 mm and the height 98 mm. The thickness of the base varied from 13 to 15.8 mm and the thickness of the sides at the base from 10 to 14 mm. These fragmentary vessels had parts of at least two sides present and in four cases there was a difference in the angle of the slope between sides on the same vessel. This difference ranged from 8 to 11°. One vessel with three sides present had two sides with similar slopes and the third with a greater slope by 10°. This asymmetry of side slope in this vessel may also be present for the other three vessels. Since only two sides are measurable on these, the "aberrant" sloping side or sides cannot be determined. The exterior corners and basal edges on all these vessels were truncated, whereas interior corners were sharp and angled.

There were also 25 rim, basal and corner fragments that because of their size and thickness may have belonged to larger vessels. On

rim fragments, broken or minimal lengths ranged from 67 to 150 mm, and thickness from 9 to 14.9 mm. Basal fragments had minimum dimensions of 6 to 154.9 mm in width and 134.6 to 207.1 mm in length. The thickness varied from 8.6 to 20.8 mm. Ten rims had exterior bevels and flat, straight lips, whereas two had no bevel and a rounded lip. One basal fragment had a basal corner angle of 112^{0} indicating that this may have been a non-rectangular vessel, but since this is the only corner present its shape cannot be definitely ascertained.

Vessels considered to belong to the larger variety have minimum dimensions of 70 mm for width, 100 mm for length and 100 mm for height. On an absolute scale these specimens may not be large. However, other vessels in this sample are smaller than these and there is no overlap between the larger and smaller varieties. In a relative sense the specimens just described are large when compared to others in the sample.

Vessels belonging to the smaller variety, with one exception, are less than 76.5 mm long, 68 mm wide and 80 mm high. The vessel that is outside these parameters is 118 mm long and 70.9 mm wide but only 59 mm high. In length and width it falls into the range of larger vessels, but in height it is well below the maximum for smaller vessels and for this reason has been included here. Thickness of bases and sides are variable within the smaller group and some are within the range of the larger specimens . However, fragments that were less than 7 mm thick were included with the smaller group.

The group of smaller vessels contains one complete specimen (Fig. 21 d); one specimen with base and three complete sides (Fig. 21 b); five more fragmentary specimens; and 21 fragments.

Since Fig. 21 d is the only complete vessel in the entire soapstone collection it will be described in detail. Its basal dimensions are 76.5

by 51.9 mm and the thickness of the base 16.7 mm. The height of the sides ranges from 52.7 to 59.1 mm and their thickness at the base is ca. 15 mm. The horizontal basal corner angles range from 86 to 93°. The slopes of the sides is asymmetrical, but in this case one of the sides is more upright than the other three. One side has an angle of 13° whereas the others are 24, 24 and 28° respectively. The rim on all four sides has a sharp, straight inward bevel of 52, 48, 32 and 26° respectively. The thickness of the lip also varies somewhat, as does the length of the bevel. The former ranges from 3.1 to 9.4 mm and the latter from 6.5 to 12 mm. Although this is a sturdy well-made vessel, the above measurements seem to indicate that it was not very symmetrical in form. Corners and basal edges form sharp angles on both the interior and the exterior. The tops of the corners have an inward sloping bevel on the exterior. This occurred on only one other specimen, a rim fragment, in this sample.

This vessel does not seem to have been completely finished, especially on the interior and along the rim. Here the surface is pitted and gouged and small striae, oriented in different directions can still be seen. These areas seem to lack final smoothing and polishing. The surface of the vessel was clean, with no traces of carbonization. It may never have been used. It was found lying top down on a flat rock in trench 1, Area E, in the region of the postulated house platform or heavily occupied area. Perhaps it was left in this position by the craftsman to await further work. The vessel does seem to indicate that exteriors were finished before the interiors. This is also borne out by several of the other unfinished pieces as well.

The other vessel that is fairly complete, has one complete side, two partial sides (all with rims) and the two corners formed by these three sides. The fourth side and an unknown amount of the base is missing

(Fig. 21 b). Its exterior basal dimensions are 110.7 mm on the complete side and 70.9 mm on the broken side. The thickness of the base is 20.7 mm. The thickness of the sides at the base ranges from 10.9 to 16.5 mm and their height from 55.4 to 59.9 mm. This vessel was shallow, thick-sided and probably broad. The horizontal basal angles are 87 and 92°, whereas the slope of the sides are 21, 24, and 27° respectively. No asymmetry of slope is present in these sides, but the third side, of course, remains unknown.

The finishing of the rims resembles the previous vessel. They have a straight sloping bevel toward the interior and a straight, horizontal lip. The exterior corners and basal edges are sharp, with no bevelling or truncation present. The interior angles are similarly formed. There is also a small, gouged hole near the rim quite close to one of the broken edges. This hole also has a small groove leading out of it towards the broken edge, perhaps to help hold a binding thong in place. An attempt may have been made to save this vessel after its initial breakage. The vessel is heavily carbonized both on the inside and outside surfaces.

The five more fragmentary specimens also provide some reliable information about form and workmanship. Maximum sizes are below those outlined for smaller vessels, but two of the specimens are very small, ranging between 63 to 34 mm in width, 42 mm long and 43 mm high. The specimen with both surfaces finished (Fig. 21 c) has an 8 mm thick base and is 6 mm thick at the base of the sides. These are the smallest specimens in the sample and they may have been toy vessels or personal warming lamps used in winter hunting. Since they lack carbonization, they do not seem to have been used for lamps.

Three of the above specimens do not have asymmetry of slope of

the sides that are present. The other two have from a 10 to 20° difference in slope of sides on the same vessel. Only one specimen has truncated basal and corner angles on the exterior, while in the others both the interior and exterior angles are sharp. All rims are finished with a single inward sloping bevel and a straight lip. On the very small thin-walled vessels the width of this lip averages 1 to 5 mm.

Twenty-one fragments may possibly belong to smaller vessels. Of these, 16 are rim fragments, one is a basal fragment and four are rim and corner fragments. They have mainly been included in the small group because of their thinness. The average thickness of the rim fragments is 4.7 mm and that of the bases is 6.2 mm. Of the 20 rims represented, nine have an inward bevel and a straight lip, nine have no bevels and a rounded lip, one has a bevel both on the interior and exterior surfaces and one is indeterminate. Exterior edges of corners and basal angles are truncated on all examples whereas interior corners are straight.

There are also numerous fragments that belong to rectangular vessels, though their size affinities cannot be determined. In this group, 62 are rims, 18 are bases with at least one side, and 18 are bases only.

Of the rim fragments, 41 have a single bevel on the exterior. The angle of this bevel ranges from 10 to 53° with an average of 35°. The thickness of the lip, which with this type is flat and horizontal, ranges from 1.1 to 7.3 mm, with an average of 2.5 mm. The length of the bevel shows much variation from piece to piece. It averages to 6.5 mm. The thickness of these fragments, as well as others in this category, does not seem to be a significant attribute as these fragments vary in size on single specimens. For example, a measure of the thickness taken near the rim is not comparable with one taken further down towards the bottom of the side. Sixteen of the rims have a single, gently rounded bevel on

the exterior, or, in other words, a double bevel, occurs on three of the rims. The angle of the bevels were 43 and 35° on one of these and 23 and 22° on the other. On the third day the exterior bevel can be measured, and this has an angle of 46°. One rim fragment has a taper that consists of a double rounded taper and a rounded lip. Also, one fragment has no taper at all, but meets the lip at a right angle.

The 18 basal fragments contributed information about one attribute--basal thickness. The range of this varies from 7.4 to 13.5 mm and the average is 9.7 mm. There are also 18 other fragments that have part of the base as well as at least one of the sides. The average of the thickness of the base for these fragments is 12 mm. The horizontal, basal angle ranges from 87 to 109°, but seven of the ten angles present are very close to 90°. Three of these fragments have remnants of two sides present. On one, the slope of the sides varies quite a bit, being 14 and 44° respectively. The other two have a more or less similar slope for both sides. The thickness of the sides, at the base, varies from 7.2 to 14 mm, with an average at 10.3 mm. It is generally true for these fragments that the thicker the base, the thicker the sides at the base are as well.

In this last group of 108 fragments, on 47 the form of the exterior corner angles and basal edges can be described. Thirty-five of these had corners truncated by a broad, flat bevel of more than 4 mm in width. One fragment has a very narrow bevel, being only 1 or 2 mm wide. Four fragments had a sharp edge, with no attempt at rounding off or flattening out these edges. Seven were rounded to a gentle, even and smooth curve.

Triangular and rounded vessels -- total 6

One vessel in the soapstone sample from the Cape Ray Light site

is of a triangular shape (Fig. 21 e). This vessel is not entirely complete, having the top part of one side missing. This vessel has three straight sides that slope outwards from a very small triangular base. This base measures 38.2, 47.7 by 49.4 mm, and is about 10.2 mm thick. The angles of the basal corners measure 58, 59 and 63° respectively. The sides, which are quite thin, with an average thickness of 10 mm, slope outward quite a bit from this small basal area. The angles of the slope of the sides is 35 and 40° for two while the third is almost horizontal at 85°. At the rim, the vessel measures 119 by 110 by 117 mm. The rims themselves are slightly curved, so that at the corners there is a gentle "v" shaped depression and the whole has a broad scallop effect. The lip is slightly rounded, as are the external corner and basal edges. This vessel shows some carbonization on both the exterior and interior, but this is not heavy.

There is only one other fragment that indicates a triangular shape. This is a very small, thick basal corner piece, but the angle of the basal corner is only 60°, strongly suggesting a triangular vessel. Triangular vessels may have been small lamps of the size appropriate for lighting or for personal warming on long waits during winter hunting. They do not seem large enough for either cooking, heating or drying. They were probably not pots or containers. If they were lamps, they did not have features that appear later on Thule lamps, such as wick grooves, or knobs, or reservoirs for liquid fat.

The soapstone sample also contains one flat-bottomed round-walled vessel and three rounded wall fragments. The rounded vessel (Fig. 21 f) resembles a flower-pot in shape. The base is flat, 9.6 mm thick and 45 mm in diameter (estimated). The side wall slopes outward by about 27° and the rim diameter is estimated to be about 60 mm. The vessel was

about 66 mm high. It is rather small, about the size of a small cup or glass, and may have been used for such a purpose. However, the surfaces are heavily carbonized and charred, suggesting that it may have been a lamp or had a similar function as the small, triangular ones in this sample.

Of the three curved fragments, all of which are fairly small, one is quite thick with one rounded corner, suggesting a low oval type of vessel, rather than a triangular one. The remaining two fragments are thinner, one again a curved corner piece and the other appears to be a side piece. Neither of these seem to belong to the cup-shaped type of vessel, but it is hard to estimate their completed shapes.

Miscellaneous specimens -- total 13

In the miscellaneous category of worked soapstone pieces were three small, flat discs, and several fragments from rectangular vessels that had been re-worked or re-modelled into containers and flat slabs.

Two of the discs were oval in shape, both were only half fragments (Fig. 23 a). They had rounded edges, were between 7 and 10 mm in thickness, and their width diameters were 48.5 and 51.5 mm respectively. Neither had any markings on the surfaces, nor were they charred. A function for these is hard to suggest; they may have been part of some kind of game, or could have been used as small palettes for mixing paint or adhesive substances but there is no direct evidence for this.

The remaining specimen is triangular in shape (Fig. 27 b). It measures 21.9 by 27.1 by 37.4 mm on the sides and is 4.4 mm thick. The edges have either a double bevel or are flat. Both surfaces are marked by a series of small, but distinct striations. These form a pattern of concentric triangles, not very well outlined. The striae cross each

other and corners are not always joined. This piece may be considered as the only example of art or decoration within the entire artifact sample for this site.

Another piece also of unknown function resembles a part of a rectangular vessel that has been re-worked. It has one corner, but one of the sides making up this corner becomes very thin and tapers downward until it merges with the base. This vessel, if indeed it was one, was certainly not four or even three sides, but may have been a low lamp or general container.

Two large vessel fragments have been re-worked into flat slabs (Fig. 22 c). They are generally oval or rectanguloid in shape and either all edges or at least two edges have been finished with a flat bevel or rounded off. The largest of these measures 107 by 219 mm and is 14 mm thick. The smaller one is not quite as regular as the larger one. It still has a small segment of one of the corners of a vessel present, and seems to have been made from a basal fragment. There are also three smaller slabs made from rim fragments. Of these, the side opposite the rim has been smoothed to a flat or slightly slanting bevel. Their widths range between 43.5 and 51.3 mm and they are only 6 to 7 mm thick. One of these (Fig. 22 a) has a small, rectanguloid slot on the broken, reworked edge. This slot is only on one surface, or in other words, does not go through the piece. It measures 28.1 by 6.6 mm and is 1.5 mm deep. It may have been a groove to hold a patching rivet across a break, at one time. Four fragments have deep, long grooves and scoring lines, probably intended for breaking up the pieces or for cutting a piece to a certain size. Several of these occur parallel to old breaks. Some are double lines close together, others mark off long narrow areas.

Specimens with patching, suspension and manufacturing features -- total 27

There appear to have been two methods utilized for patching and saving broken vessels. The most common one was by means of gouging either one or more small holes on either side of a break and tying the pieces together by a thong or twine. Some form of adhesive gum may have been applied to the broken edges, but no material of this nature was found on any of the pieces. Mending holes of this nature were found on seventeen pieces, thirteen with single holes and four with double holes. The holes are irregular in cross-section and have one or more grooves leading out of them (Fig. 22 a). It appeared that five holes were made from the exterior, one from the interior, and five from both surfaces; six could not be oriented as to which side was which. The mending holes occurred in a variety of places on vessels: near rims, near corners and along sides. The little grooves that adjoined the holes quite frequently pointed in the direction of a break, and they may have been deliberately made to help countersink the binding tie. None of the holes seemed to have been made for suspension purposes. At least, this is true for those that were on orientable fragments. They were just not in a proper location to function for suspension.

The other method of patching together broken vessels, was by means of a solid bar, placed horizontally across the break. One piece has the bar still in place (Fig. 22 b). The bar rests in a shallow, rectangular hole that is a little larger than the bar, presumably to accommodate an adhesive agent that must have been used to hold it in place. The material surrounding the bar now is burnt and charred. The bar itself is made of chert, being about 6.2 mm long and 3.7 mm high, and its top surface has three small bevelled facets. In addition to this piece, another fragment has a slot for a bar, with the bar missing, another has two slots, side

by side and a third has a small hole at one end of the bottom of a single slot. This hole may have been used for tying the pieces together after the bar failed to hold.

Thus, there are several ways to repair vessels that had broken, so that they could be re-used. This seems to indicate that soapstone was scarce or that the labour invested in making a vessel, especially the larger types, was great and the finished product not readily abandoned.

There is only one definite suspension feature present in the soapstone sample. A rim fragment, probably belonging to a larger rectangular vessel (minimum height 108 mm) has a "lug" or oval knob on the exterior surface, about 40 mm below the lip of the vessel (Fig. 23 b). This feature measures 22.8 by 5.1 mm and is at least 3.7 mm high. The top of this lug was lightly scraped by a trowel during excavation, and may have been a millimeter or two higher. It seems ideally suited for use either as a support for a thong for suspending the vessel or as an aid in gripping and lifting the vessel. No wear marks from a thong could be seen on the feature. Another fragment, again from a larger rectangular vessel, had a trace of a similar lug on one surface.

There are also seven fragments that indicate something about how the soapstone was worked and made into vessels. These all appear to be fragments from rectangular vessels. The manufacturing markings on these pieces vary from fine striations to broad, shallow gouges to deep gouges or scoring marks (Fig. 23 d, e). This information together with what has already been described on the previous pieces indicates the following generalities about the process of making vessels. The exterior was finished first. There are several vessels with the interior very rough and unfinished. The interior angles and corners, which in the majority of cases are very acute and sharp, were first marked out by a deep groove

and then the sides bevelled off to form straight surfaces. The final product has a smooth, polished surface finish. Earlier stages of finishing show that the rough shape of the vessel was pecked out. At this stage, the walls were usually quite thick and thinning was achieved by scoring the surface into small knobs and breaking off these knobs. This may have been done by a variety of pointed tools -- gravers, perforators, even burin-like tools. The irregular surface was then smoothed by scraping with a flat-ended tool, probably made of chert or quartz, and probably an end-scraper. The width of the shallow grooves left-over from this process fits well with the distal end width of several types of end-scrapers, but especially the long, narrow end-of-blade type. This does not exclude other types of tools, but in the absence of metal, the material used must have been a hard stone such as chert or quartz. The presence of fine striations, going in many different directions on the same surface, indicates that the next-to-final smoothing was probably done by a hard, gritty type of rock, perhaps with water and sand acting as added abrasives. The final polishing of the surface seems to have been done by a finer abrading stone and perhaps by burnishing with softer material such as hide or skin.

Rectangular vessels account for 94% of the Cape Ray soapstone sample. The abundance of rectangular vessels seems to be the case in other Newfoundland Dorset sites (Harp 1964a) as well as for Dorset in general (Taylor 1968b). The Cape Ray Light site, as well as those sites in Newfoundland reported by Harp (1964a), has a great amount of charcoal within the occupation layer and several definite open hearth areas. It seems that with the availability of wood, open fires were used for cooking, lighting and heating instead of an oil burning lamp. Also, of course, Newfoundland has a fairly mild winter which would not require an elaborate

heating technology. This may account for the lack of oil lamps in the Newfoundland sites.

The most common type of rectangular vessel has a straight base, and straight outward sloping sides. The angle of the slope of the sides varies from vessel to vessel as well as on the same vessel, but it does not generally exceed 35^{0}. The definite asymmetry of the slope of one of the sides, usually by being quite a bit more than the other three, is a unique feature; one that, I believe, has not been reported before on Dorset sites. Its purpose is hard to infer. It may have made pouring of liquids out of vessels easier. Several vessels have one side more upright than the others, and again this may have been for ease of manipulating the contents. The rims, in a majority of cases, have a short bevel on the exterior and a straight, flat lip. The external corners and edges are usually truncated to a flat bevel. There is some variation in size of vessels. The larger varieties seemed to have been used for cooking. They are of the appropriate size and usually encrusted by charred and carbonized material. The smaller vessels may have been toys, small cups, containers or personal warming lamps. Some of these specimens are often clean with no encrustations. These types of rectangular vessels are common in Dorset culture and form the majority of types found. Soapstone samples from most Dorset sites are small, but rectangular vessels appear to be more of an earlier rather than a later trait.

Triangular and rounded pieces have usually been considered to be lamps (Harp 1964a; Taylor 1968b). Dorset lamps very seldom have definite lamp attributes beyond a non-rectangular shape. Harp (1964a) does describe one piece from the west coast of Newfoundland that had a possible wick groove, but in general they seem to be just simple receptacles for oil, with probably a floating wick. As has already been pointed out for

the cup-shaped vessel from the Cape Ray Light site, these vessels may have had other uses as well.

CATEGORY 7: BLADE AND FLAKE TOOLS AND USED FLAKES

Bifacial flake knives -- total 38 (Fig. 24, d to f)

These are large, thin, well made bifaces that have symmetrically convex lateral edges. They tend generally to have a leaf-shaped or triangular outline with a straight or convex base. The basal area is quite thick and biconvex in longitudinal section and these seem not to have been hafted into handles. Consequently, they were not included in the end blade category. One specimen has grinding on both surfaces and is much flatter and thinner than the rest. Eleven of the specimens have tip fluting or thinning. All are made of chert. Many are broken especially in the basal area. The length of complete specimens ranges from 36.2 to 52.4 mm, the width from 22.2 to 26.4 mm and the thickness from 4.8 to 15.2 mm.

Bifacially retouched flakes, random form knives -- total 46 (Fig. 24, g, l)

These generally resemble the above class in shape, but they are much cruder and thicker and retouched only on the lateral edges. The type of flake that these are made on varies from flat, thin to thick and irregular. All are of chert, except one which is made of quartz. Their length ranges from 27.8 to 75.7 mm, their width from 14.6 to 22.2 mm and their thickness from 3.5 to 14.7 mm. These tools may have had a cutting or sawing function. Again their basal areas are crude and thick and probably preclude any hafting of these flake implements.

Thick bifaces with sinuous edges -- total 20 (Fig. 24, a, b)

These are relatively thick but small bifaces that cannot be

choppers or cleavers, though their function may have been hacking and smashing. Lateral edges are very rough and jagged and when viewed edge-on are sinuous. In shape they are leaf-shaped with a rounded base and in cross section markedly biconvex. Their average thickness is 15.5 mm and in size they average 56.4 mm by 39.2 mm. All these specimens are of chert.

Unidentifiable bifacial fragments -- total 49

These include a variety of thick and thin fragments of bases, mid-sections and tips. They may belong to any of the three previous classes but they are too small to be positively identified with any specific one. All these fragments are of chert.

Bifacial graver -- total 1

This is the distal end fragment of a well retouched, flat and thin bifacial tool that has a small deep concavity at one of the distal corners. This has produced a sharp, beak-like projection at this corner that may have been used for incising and engraving. The sides and distal edge are straight, with the sides contracting slightly towards the distal end. Its broken length is 19.3 mm, the width of the distal end is 11.5 mm and its maximum thickness is 4.2 mm. It is made from chert.

Unifacial flake knives -- total 25 (Fig. 18, h to k)

These are generally well formed specimens characterized by varying amounts of retouch on the dorsal surface, but all have substantial retouching of the lateral edges. This lateral edge retouch has produced implements of several varying shapes. The function of all these unifacial implements was probably similar. They seem best suited for cutting and sawing. None has edges that could be called scraping edges. Twelve

specimens are leaf-shaped. They have symmetrical convex sides that join at a pointed or rounded tip. The bases are straight or gently convex. Eight of the leaf-shaped specimens have smooth lateral edges while four have a denticulate or serrated edge (Fig. 18 h). These latter four may have been used for sawing. One leaf-shaped specimen has retouch over the dorsal surface and two have some basal thinning. They vary in size from 44.3 by 24.8 by 6.7 mm to 21.6 by 13.7 by 4 mm, and all are of chert. Ten unifacial knives are asymmetrically triangular in shape (Fig. 18, i, j). They tend to have a straight to slightly concave base, and basal thinning is present on four of these specimens. One lateral edge is straight while the other is markedly convex. Both converge to meet at a generally sharp tip. Five specimens are convex on the right side and five are convex on the left side. Six have been retouched on the dorsal surface in addition to the lateral edges. These specimens range in size from 40.5 by 25.2 by 6.8 mm to 17.2 by 3 mm and may also have functioned as knives. Two specimens are unilaterally tanged. They have a generally ovoid body, a broad, convex distal end and a single shoulder along one lateral edge. The stem is broad and straight and ends in a gently rounded base. These may have been end-hafted knives. The last specimen is a transverse or oblique edged knife (Fig. 18 k). It has a straight base, one straight side and one side that expands away from the base and then angles across to meet the other side. It is well made with retouch over most of the dorsal surface. It measures 21.7 by 12 by 1.8 mm. All specimens in this class are made from chert.

Unifacially retouched blade tools -- total 8

These are tools that have been made on blades and microblades. They have extensive retouch that has produced tools for several different

purposes. Two may be side scrapers. They have straight sides that have very steep retouch resembling a scraping edge. Both specimens are broken but their width is 7 to 8.5 mm and they are about 3 mm thick. Two specimens are short fragments that have well developed denticulated edges. They are 7 and 10.2 mm wide and 2.5 to 3.6 mm thick. Two others are tip fragments from perforators. The sharp tip or end has been formed by both dorsal and lateral edge retouching to produce a tapering end. These are 9 to 13 mm wide and about 3 mm thick. The remaining two are fragments of some sort of knife-like tool. One is a basal fragment, with a concave base and gently convex lateral edges. The other is a straight-sided mid-section fragment that has careful retouching all over one surface. The other surface is the dorsal surface of the original microblade and has one arris present. These two specimens in this class are retouched on the dorsal surface of the original microblade and have from one to two dorsal arrises. All the unifacially retouched blade tools are made from chert.

Unifacially retouched tools, perforators -- total 22 (Fig. 24, h to k)

Sixteen of these are made on flakes. Retouching of these flakes is very minimal, occurring only near the pointed working tip of the artifact. It seems that flakes that were already pointed were selected and then the tip area made sharp by minimal retouching. In overall shape the perforators are quite variable and irregular, but generally they have been made on elongated flakes. They range in length from 24.1 to 62.5 mm and in width from 15.9 to 29.3 mm. Generally these flake perforators are thick, but it ranges from 5 to 12 mm. They are all made of chert. Six perforators are on blade-like flakes. Five of these are chert and one is quartz. Several of these have lateral edge retouch all along the sides. The purpose of this retouch was to contract the edges to a sharp point

or tip. Some have just been obliquely snapped across the flake and the corners retouched to a point. All have extensive use wear on the working tip or point. Since these have been made on blade-like flakes they are more regular in shape than the flake perforators. They are narrow, rectangular and thin. Their lengths vary from 10.2 to 28.2 mm and their widths from 6 to 10.2 mm. Their average thickness is 2 mm.

Unifacially retouched flakes, concave working edge -- total 5

These have all been made on rough and irregular flakes. Three have a single concavity along one edge that is narrow and deep and gives these artifacts the look of spokeshaves. Two have a double concavity along one edge. These concavities are much broader and shallower than on the preceding ones and give these specimens almost a denticulate edge. The concavities have careful, steep retouching that almost resembles a scraping edge. Their lengths range from 17.7 to 36.9 mm and their widths from 10.3 to 18 mm. Four are of chert and one is made from quartz.

Unifacial edge retouched tools -- total 67

All these specimens are characterized by having one or more edges retouched by either shallow or steep flaking. No other shaping or dorsal surface retouch is present. The retouched edge is usually straight and these artifacts may have functioned as knives or scrapers. All are made of chert and from fairly thin flakes or blade-like flakes. The largest one measured 56.5 by 18.9 by 9.5 mm and the smallest 39.7 by 10.6 by 2 mm.

Minimally retouched flakes -- total 114

These specimens have retouching in very small amounts, usually along the lateral edges. This flaking is irregular and sometimes discontinuous. Most are thin flakes but some are thicker shatter fragments

and others are blade-like flakes. These specimens appear to be general cutting, sawing and scraping tools. Eight are quartz and the remainder are made from chert.

Used flakes -- total 126

The use wear on these flakes varies from a minimal amount on one edge or end to more extensive use along the entire edge. Some have battering and crushing wear as well and may have been used for heavier breaking and bashing. Seven specimens are of quartz and the remainder are of chert.

CATEGORY 8: ROUGH STONE

Hammerstones -- total 15 (Fig. 25 c)

These are small oval or rounded smooth beach pebbles or cobbles that are pitted and scarred on one or more surfaces as a result of use. They vary in length from 80 to 120 mm and in diameter from 35 to 75 mm. Three are oval pebbles with hammering marks on both ends and two oval pebbles are marked on the ends as well as along the edge. Three are rounded or discoidal pebbles with some battering on one of the flatter surfaces and on the edges. The remaining seven are fragmentary hammerstones with one end showing some battering. The hammerstones are made of a variety of material including sandstone, basalt, granite and the volcanic conglomerate rock that forms the bedrock of a large part of the site.

Mauls -- total 5 (Fig. 27 c)

These specimens are also ovate beach cobbles but much larger and heavier than the hammerstones. Three have extensive pitting and scarring on the narrow ends while two are marked on the ends as well as on several

areas of the surfaces. They seem all to be made of a granitic rock. The largest measures 85 by 190 mm while the smallest is 72 by 13 mm.

Anvil stone -- total 1

This again is a smooth beach pebble but is shaped like a round flat disc. One of the flat surfaces is marked by extensive and heavy battering. It measures 76 mm in diameter and is 42 mm thick.

Pebble wedges -- total 7 (Fig. 25, d, e)

These specimens are ovate sandstone pebbles that have very heavy battering marks on one narrow end with the other end sharpened by either unifacial or bifacial flaking. This sharp edge is also chipped and battered as if it had been heavily used. The sharp edge may have been the thin edge of the wedge and the opposite battered end may have received the blows to drive in the wedge. The largest is 132 mm long and 62 mm in diameter while the smallest is 90 mm long and 41 mm in diameter.

Abraders -- total 4 (Fig. 26 a)

These are small, flat and irregular sandstone slabs that have small areas of polishing and grinding wear on them. This wear occurs on both the flat surfaces and the edges, and on many it is very extensive. The largest measures 70 by 60 by 30 mm and the smallest 66 by 38 by 20 mm.

Choppers -- total 9 (Fig. 25, a, b)

Three specimens are made of sandstone, quartzite or chert pebbles. All have extensive flaking and fashioning. Four are classic pebble choppers with over half the pebble cortex or natural surface untouched and one narrow end of the pebble bifacially flaked into a sinuous cutting edge. The others are more irregular in shape and fairly thin, with a plano-convex cross section. The edges are crudely and bifacially chipped

to produce an irregular, sinuous cutting edge. The largest specimen is 111 mm long and 85 mm in diameter at the butt end, the smallest is 80 mm long and 50 mm in diameter.

Irregular fragments used as choppers -- total 8

These specimens do not have a regularly fashioned working edge but appear to be large fragments of shatter, core rejects and natural rocks that have heavy use battering and wear present on one edge. These seem to be pieces of rock that were utilized on an ad hoc basis.

Edged sandstone slabs -- total 22 (Fig. 26 b)

These are naturally flat and straight surfaced sandstone slabs that have been worked and retouched on the edges. Some of these may have formed sides or bases for rectangular vessels but none have any evidence for corners or rims. They may have been used for cutting boards or meat trays. One is in the shape of a half-moon, with a slight amount of wear or polish on one flat surface. It is 210 mm long, 95 mm wide and 16 mm thick. Four fragments have squared off corners and flat, straight edges, while another fragment has a rounded corner. These five fragments are very thin and probably do not belong to vessels. Two specimens have a bifacially chipped edge and may have been cutting and sawing tools rather than containers or slabs. The remaining 13 are small fragments with one finished edge, usually straight and flat.

CATEGORY 9: MISCELLANEOUS

Cordage -- total 1 (Fig. 27 a)

This specimen is the only organic artifact preserved on the Cape Ray Light site. It was found in the damp and mucky bottom part of the

occupation layer in trench 8, Area F. It was probably preserved, along with other small patches of seal fur, because of the anaerobic atmosphere of this very dense, mucky soil. This short piece of cord is made of three strands of tightly rolled fur. The strands have then been twisted together from right to left or by S-twisting. The thickness of the finished cord was probably not more than 4 mm. This is the only known occurrence of twisted or twined cordage to be found in the Arctic culture, the usual type of cordage being single strands of sinew or hide thongs. The cultural significance of this isolated specimen cannot yet be determined, except to note that it existed in Dorset culture in Newfoundland.

CATEGORY 10: DEBITAGE -- TOTAL 19,549

This category included any material that was judged to give some indication of resulting from human workmanship. The types of debitage ranged from a variety of different sized shatter to small retouch chips and irregular fragmentary and unused flakes. Counts were also done on the debitage on the basis of the kinds of raw material represented. These were divided into three broad groups -- chert, quartz and other. The last group included such stone as granite, sandstone, volcanic conglomerate, basalt and some unidentifiable fragments. Soapstone material was not dealt with in this section but has been covered previously within the soapstone category. The distribution of debitage and the frequency of types of raw material for the Cape Ray Light site have been outlined in Table Ten. The overwhelming type of raw material was chert, at 89%, with quartz being the next most frequent at 7% and other types of stone represented by 4%. This seems to generally follow the percentages of raw material used for the manufacture of artifacts. The colour of the

TABLE 10

DISTRIBUTION OF DEBITAGE
CAPE RAY LIGHT SITE

Area C

S			Layer III			Total		
Chert	Quartz	Other	Chert	Quartz	Other	Chert	Quartz	Other
1,784	117	49	6,316	548	428	8,100	665	447

Total: 9,242

Area E

S			Layer III			Total		
C	Q	O	C	Q	O	C	O	O
1,142	49	13	3,645	260	124	4,787	309	137

Total: 5,233

Area F

S			Layer III			Total		
C	Q	O	C	O	O	C	O	O
626	50	20	3,726	292	111	4,352	342	131

Total: 4,825

Surface:

General Surface			Surface A		Surface B		Total		
C	Q	O	C	O	O	C	C	Q	O
121	63	16	35	5	7	2	158	68	23

Total: 249

TABLE 10 (continued)

Total for all areas:

C	Q	O
17,397 (89.2%)	1,384 (7.9%)	768 (4.9%)

Grand Total: 19,549

chert, both for artifact manufacture and as it appeared in the waste material, was generally light. It ranged from a very light grey or creamy white to a darkish brown, with a small percentage being dark grey and black. The luster of the material tended to be dull, though a few specimens had a waxy shine and were yellowish brown in colour. Quartz specimens varied from clear crystals, to milky or clouded crystalling forms to grainy material that bordered on quartzite.

The rejectage recovered from the three main site areas seems to indicate that differences in amounts exist between them. If the amounts of rejectage for each area is divided by the area excavated then Areas C and E produced 21 pieces of waste for each square foot of occupation layer and Area F only 13 per square foot of occupation. These figures are not an accurate indication of such density because the volume of the occupation layer was not used to derive them, but they do seem to reflect a heavier occupation of the eastern area of the site (Area C) than of the western (Area F). This is also borne out by the distribution of artifactual material (Table 5).

Artefact Analysis

PITTMAN SITE

The Pittman site artifact sample contains 7,414 specimens. Of these 1,403 are worked and the remainder is stone debitage. No artifacts made from organic material were found at this site. Table Eleven shows the distribution of artifacts in the undisturbed occupation layer, IV; from the surface; and in the disturbed layers I, II, and III. About 48% of the artifact sample came from the undisturbed occupation layer.

Excluding retouched blade and flake tools, used flakes and core preparation detritus, about 48% of the artifact sample is made up of four classes: triangular end blades, end scrapers, microblades and soapstone. As at the Cape Ray site, these are the commonest artifacts and make up the bulk of the Pittman site sample.

The majority of the artifacts are made from either chert, quartz or soapstone. Minor material includes slate, quartzite, dolomite, granite and sandstone. Raw material types and counts are given in the appropriate class descriptions. The debitage sample also had a high proportion of chert (74.2%) and quartz (13.1%), which reflects the situation in the artifact sample.

The artifact sample is described according to a similar system of categories and classes as that used for the Cape Ray Light site. However, there are artifact differences between the two sites and not all classes are present at both sites. A similar method of analysis and description was used for classes that were present at both sites.

TABLE 11

SITE DISTRIBUTION OF ARTIFACT MATERIAL
PITTMAN SITE

Category and Class	Location						Total	% of Total
	Undisturbed Occupation Layer	Disturbed Layers						
	IV	S	I	II	III	Total		
End blades, triangular	98	9	36	36	1	81	179	12.76
End blades, side-notched, all classes & fragments	26	4	5	9		18	44	3.14
End blade fragments	17	4	8	10		22	39	2.78
Side blades	1			4		4	5	.36
Burin-like tools	2		1	1		2	4	.29
Burin	1						1	.07
End scrapers & fragments	84	9	30	47	1	87	171	12.19
Side scrapers, concave	2	1		1		2	4	.29
Ground slate and chipped and ground slate	6	1		3		4	10	.71
Microblades	118	11	68	60	2	141	259	18.46
Core preparation flakes and detritus	108	13	56	71	1	141	249	17.75
Microblade cores and fragments	12	1	7	9		17	29	2.07
Microblade core blanks	15	3	10	2		15	30	2.14
Flake cores & fragments	7	7	7	7		21	28	2.00
Soapstone, all items	25	14	6	8	2	30	55	3.92
Blade, flake tools and used flakes	147	29	61	50	5	145	292	20.81
Rough stone	4	-	-	-	-	-	4	.29
Totals:	673					730	1,403	100.02%
Debitage (see table 12)							6,011	
				Overall Total			7,414	

CATEGORY 1: BIFACIAL END AND SIDE BLADES

Triangular end blades -- total 179 (Fig. 28, a to g)

In overall shape, these end blades are similar to those from the Cape Ray Light site. The same attributes, both metric and non-metric, were analysed for this sample and the results appear in Tables Six and Seven. As concerns the size of these end blades, the two sites are very similar. The means as well as the ranges for length, width, thickness and the distance these last two are from the base appear to have no significant differences and in some cases are almost identical (Table 6). Fragmentary blades were also included in the analysis and the frequency of breakage classes is outlined in Table Six.

A few differences that may be significant do, however, occur in shape and manufacturing characteristics between the two sites (Table 7). Tip form of end blades from the Pittman site are about equally divided between sharp and rounded tips as at the Cape Ray site. However, the Pittman end blades have 7% less sharp tips and an increase of 6% of blunted tips. There is also more of a tendency toward straighter bases at the Pittman site. The proportion of straight bases is about 4% higher and those with concave bases is less by 19%. These differences between the two sites may be accounted for by the great difference in size between the two samples, and the fact that on almost half of the Pittman sample base shape could not be determined, whereas at the Cape Ray site only a third were indeterminant.

Longitudinal and cross sectional shapes also vary somewhat. The Pittman sample is trending away from the plano-convex varieties, with more of the specimens being biconvex for both attributes. Plano-convex cross-sections were lower by 12.5% and biconvex ones higher by 10% in the

Pittman sample. Biconvex longitudinal sections were higher by 12.3%. But it was also noticed during analysis that the biconvex specimens tended to be asymmetrical with the dorsal surface more rounded than the ventral. This may echo the plano-convex shape which is also asymmetrical. The difference between these two shapes may be more in the mind of the analyst rather than the maker. A few Pittman end blades were also asymmetrical in overall outline. This asymmetry was mainly located in the basal areas and was usually rather slight. Sometimes it was an attempt to repair the artifact after one of the basal corners had broken off (Fig. 28 g).

Tip thinning or fluting occurs much less frequently at the Pittman site. The number of non-fluted tips is more than two times fluted ones while there is an almost one to one ratio at the Cape Ray Light site. Tip fluting appears to be an early and middle period Dorset characteristic and its lower frequency here may indicate temporal differences. The difference of 20% seems too great to be explained by sample size only.

Another characteristic that indicates differences between the two sites is the absence of basal grinding in the Pittman sample. Though the frequency of ground end blades was small at the Cape Ray Light site, it did occur on 30 specimens and it was totally absent at the Pittman site. Surface grinding of end blades seems to be confined to Newfoundland and no temporal differences can yet be established for this trait. The difference may indicate that grinding was more popular on the west coast than on the north.

Lateral edge serration is absent at the Pittman site, but it is also negligible at the Cape Ray Light site, so this feature does not characterize either sample. The availability of raw material seems to have been different at the Pittman site. Chert is of a poorer quality

and used less for end blades whereas quartzite, which could be obtained locally was used more. Also, a variety of local stone, such as the greyish dolomite to be found just west of the site and pinkish granite were also used in end blade manufacture.

As at the Cape Ray Light site, these triangular end blades probably functioned to tip projectiles such as harpoons, darts and perhaps arrows. Their variation in size seems to indicate that they were used on a variety of hunting implements. Also, the high frequency of tip and basal fragments further suggests that they were end-hafted and tended to break across the middle at the limit of the haft element.

Side-notched end blades, single notches and symmetrical -- total 13 (Fig. 28, k to n)

The first group within these end blades consists of six plano-convex and two biconvex specimens that have convex lateral edges and a sharp pointed tip (Fig. 28, k, l). The notches are deep, narrow and well made. The lateral edges below the notch to the basal corners are straight as is the basal edge itself. The surface retouching is even and regular and in general these end blades are well and carefully made. Their lengths range from 24.7 to 31.8 mm and their maximum widths, which occur just above the notches, clusters tightly around 12.5 mm. The average thickness of these specimens is 3.7 mm. They are all of chert and probably functioned as projectile end blades.

A second group of five chert specimens are generally similar to the first group. They differ in having straight sides and a broad rounded tip (Fig. 28 m). Also, their notches are not as pronounced or well made as in the first group. In size, they are also very close to the first group. They may also have been used as tips for projectiles, because as

previously noted for triangular end blades, a rounded tip does not seem to preclude an end blade from this function.

Side-notched end blades, multiple notches -- total 4 (Fig. 28 j)

All four are fragmentary. Three are basal half fragments and one is a lateral edge fragment. These end blades have two notches on either lateral edge. These notches are opposite each other and usually symmetrical. The bases are straight to concave with a slight amount of thinning in the basal area. The lateral edges are straight and they converge toward the tip. Their function seems again to be projectile end blades.

Asymmetrical side-notched end blades -- total 9 (Fig. 28, o to q)

All nine specimens are of chert and generally similar in overall shape. They have a straight or slightly concave base; single, poorly developed and shallow notches; one lateral edge that is straight or slightly concave and another that is usually convex or converges toward the distal end at a much steeper angle than the other. Four have fairly sharp tips, three are rounded and two have concave tips. Two of the rounded tip variety are not as pronouncedly asymmetrical in outline, and are ground on both surfaces (Fig. 28 p). This grinding is confined to the mid-portion and does not extend to the edge, but does extend from the area of the notches for about 2/3 along the length of the artifact. Their asymmetry taken together with a prevalence of rounded and concave tips suggests that these specimens were probably end-hafted knives, rather than projectile points.

Side-notched end blade fragments -- total 14 (Fig. 28 h, i, n)

Ten of these are basal fragments, two extend from the notch to the tip on one lateral side and the remaining two are basal corner fragments. Bases are straight to slightly concave and most have several short

thinning flakes removed from both basal surfaces. Six specimens have small but deep notches, six have shallow, broad notches with irregular interior edges (Fig. 28 h), while two have vague indentations that may not even be notches (Fig. 28 n).

Tanged, single shoulder end blades -- total 4

One of these very unusual specimens is complete. It is difficult to describe because it is hard to determine which is the distal end and which the proximal. The pointed end will be arbitrarily selected as the distal end. The artifact then, has a straight base, almost 90^{o} basal corners, two straight sides, one of which proceeds directly to the sharp tip while the other has a sharp concavity about 8 mm from the tip. There is also extensive grinding on one surface, from the base to the area of the tang and not extending to the lateral or basal edges. The artifact is 21.6 mm long, 12 mm wide and 3 mm thick. Its use can only be speculated on. If the tip end was the working edge, then it may have been a graver or perforator of some sort. If the straight basal end or its corners were used, then it may have functioned in the manner of burin-like tools. The corners are sharp and strong enough for grooving, incising and slotting bone.

There are also three fragments that seem to be from this type of tool. One is a fragment containing the tang and the sharp tip while two are fragments from the square basal end. Both have surface grinding in a similar location to the complete specimen.

Burin-like tools -- total 4 (Fig. 29 n, o)

There are two complete specimens, one distal end fragment and one basal fragment. Figure 29 n has a broad side-notched base that is somewhat asymmetrical. The sides are straight and converge to a narrow

straight distal end. The distal end has a ground double-bevelled edge. The grinding on the lateral edges is confined to the immediate distal corner area only extending down the edge for a couple of millimeters. This has produced two very strong and sharp corners. Both surfaces are extensively ground. In longitudinal section, the basal area is thicker and has two straight parallel surfaces whereas the distal part narrows to the bit end by a converging on both surfaces. This makes the basal area thicker and stronger and the bit area thinner and finer. The length of the specimen is 26.3 mm and its maximum width at the base is 19.3 mm.

The other complete specimen has a narrow base, broad side-notches, and straight converging edges to an obliquely angled distal end (Fig. 29 o). Both surfaces are ground and this grinding extends right to one of the lateral edges that is also ground. The basal area and the other lateral edge areas are not ground. The ground lateral edge has a rounded shape. The distal end is partly chipped and partly ground by a flat bevel. The junction where these two edge bevels meet is, unfortunately, missing. This burin-like tool is 18.4 mm long, its maximum width is 10.1 mm and its thickness 2.2 mm.

The basal fragment is from a broad base, side-notched type such as Figure 29 n. The remaining fragment is from the distal area of a burin-like tool. It is ground over both surfaces and ground to a straight bevel on one lateral edge and a unifacial bevel on the distal end. It resembles the narrow base type somewhat in this regard. All burin-like tools are made from chert. The sharp, strong, distal corners, formed at the junction of ground distal and lateral edges, may have been used for the gouging, incising and grooving of hard materials such as wood and bone. Their function, in other words, may have been similar to true burins.

Burin -- total 1 (Fig. 29 m)

This single specimen has a broad base that is vaguely side-notched or stemmed. One edge has a vertical burin scar and at the base of this scar are several other hinge fractures indicating that more than one burin spall was removed from this face. The surface of the longitudinal burin scar is ground, as is the distal edge. The grinding of these edges is reminiscent of burin-like tools, but the scars along one lateral edge seem to have been produced by the burin spall technique. This artifact may be an intermediate type, indicating a transition from the true Arctic Small Tool burins to the Dorset burin-like tool. One surface of this burin was also ground in the manner of burin-like tools. This one unique artifact seems to indicate a rather early Dorset affinity for part of the Dorset component from the Pittman site. But since it is a single artifact, and burin spalls did not occur in the sample, a true burin technology does not seem to be an important part of the Pittman site component.

Bifacial end blade fragments -- total 39

Thirty-seven of these are of chert and two of grey dolomite. Fifteen are basal fragments and there is quite a bit of variety in basal fragments in this group. One basal fragment has a small asymmetrical stem. One has a straight base and straight sides that expand outward, while another has expanding sides but has a concave base. Two also have expanding sides but these sides are convex. Eight specimens have straight sides that are parallel to each other. The remaining two have straight bases but too little of the sides remain to describe their form. Fifteen are tip fragments. Eight of these are sharp, three are rounded and four are straight ended. The remaining nine are body fragments and all appear to be either straight sided or slightly convex sided.

These fragments may be from a variety of bifacial end blades, but none are definite enough to be included with any specific class.

Bifacial side blades -- total 6 (Fig. 29 r, s, t)

Five of these are leaf-shaped with convex edges and sharply pointed ends (Fig. 29 s, t). They have been well made with fine parallel retouching on both surfaces. In cross section, they are biconvex or slightly plano-convex. One lateral edge is usually thinner and more carefully made than the other and it seems that this formed the working edge while the other may have been hafted into the side of a bone or wood handle. They are generally thin and flat. In length, they vary from 12.4 to 25.6 mm, in width from 5.6 to 11.1 mm and average about 2 mm in thickness. All specimens are of chert.

The remaining chert specimen is of a rectanguloid shape with an oblique angled end (Fig. 29 r). It is plano-convex in cross section but bifacially worked. The retouching along the convex, angled lateral edge is very fine and has produced a good working edge. This was probably the exposed side of the blade. The specimen measures 11.2 mm at its widest point, is 28.9 mm long and 3.9 mm thick. This side blade resembles one illustrated by Collins and found at the T1 site on Southampton Island (1956: Plate VII, Fig. 4).

CATEGORY 2: GROUND SLATE

Ground slate side-notched end blade -- total 1 (Fig. 30 p)

This is a mid-section fragment of a biplano end blade, with bevelled edges. It has straight sides that converge toward each other. There are two deep, V-shaped notches opposite each other. There are also several grooves on the surface and one of these may have led to a hole. This

specimen is similar to side-notched end blades from the Cape Ray Light site and probably functioned as a tip for a harpoon head.

Chipped and ground slate celt -- total 1 (Fig. 30 o)

This is a fairly small celt made from greenish slate. Basal and lateral margins are chipped and flaked while both the dorsal and ventral surfaces are ground, especially in the bit area. Both the longitudinal and cross-sections are evenly biconvex in shape. The bit has a straight edge and is symmetrically bevelled on both surfaces. The specimen is 44.9 mm long, 32.7 mm wide at the bit end and 13.1 mm thick. This celt was probably end hafted and may have been used for working wood or even perhaps for skins.

Ground slate fragments -- total 9

Three of these fragments appear to be from mid-sections of implements as they both have flat surfaces and one bevelled edge still in evidence, but both ends are missing. They are also very thin, averaging 2.5 mm. The other six are very rough, badly broken pieces, with some ground areas still present. They are also fairly thin fragments, but beyond this, they remain unidentifiable. All nine fragments are of a light brown to grey slate.

CATEGORY 3: SCRAPERS

End-of-Blade scrapers -- total 24 (Fig. 29 e, f)

These specimens are blades or microblades that have one narrow end, usually the end opposite the striking platform, retouched to a steep angled scraping edge. Other retouch on the artifact is minimal. Most of them are made on triangular or single arris microblades. The one complete scraper is 26.2 mm long. In width, they range from 8.2 to 24.8

mm. One is of quartz and the others are made from chert.

Quadrangular end scrapers -- total 5

None of these are complete, but enough of the distal and lateral edges are present to indicate a straight and almost parallel sided form. Two of these are retouched over most of the dorsal surface, while another has retouch in the proximal area of the ventral surface. They range in width from 12 to 15.8 mm, and in thickness from 2 to 5.8 mm. One is of quartz and the others of chert.

Triangular straight edged end scrapers -- total 5 (Fig. 29 b)

These are scrapers in the form of broad triangles with a wide distal end and a narrow, straight basal end. The working edge is straight and the distal corners sharp. The angle of the scraping edge is steep. One specimen has both dorsal and ventral surface retouch, while the others are only minimally retouched along the edges. The one complete specimen measures 27.5 mm in length. In width, they range from 14.2 to 21.4 mm and in thickness from 3.2 to 4.8 mm. All specimens are made from chert.

Triangular rounded corner end scrapers -- total 10 (Fig. 29 a)

Only four of this type are complete. The rest are distal half fragments. They have straight to slightly convex sides that contract to a narrow, straight base. The working edge is moderately convex and the corners are evenly rounded. They usually have steep scraping angles. Four have been retouched over the dorsal surface and two on the proximal areas of the ventral surface. In length, they range from 15.2 to 30.5 mm, in width, from 11 to 23 mm, and in thickness from 1.5 to 6.5 mm. Three specimens are of quartz and seven of chert.

Triangular end scrapers with sharp symmetrical corners -- total 42 (Fig. 29 c)

These scrapers range from a triangular shape to a tear-drop type of shape, with an almost pointed base. The distal or working edge is convex and both corners are sharp. The overall shape of the artifact is symmetrical. Sixteen have retouching over the dorsal surface and five are worked on the proximal areas of the ventral surface. Length measurements range from 14 to 26.8 mm, width from 11.4 to 26.4 and thickness from three to 6.2 mm. Two are of quartz and the remainder of chert. Although this is the most popular class of end scraper from the Pittman site, it is not as overwhelmingly popular as at the Cape Ray Light site.

Triangular, sharp-and-rounded corner end scrapers -- total 2

These scrapers seem to be a variant of the rounded and sharp cornered types and perhaps from a transition to the asymmetrical sharp corner types. The distal or scraping edge is convex in shape and both have the right distal corner sharp and the left rounded. One has both the dorsal and ventral surfaces retouched and the other is only laterally retouched. They are almost equal in size measuring 21.2 by 13.8 by 5.2 mm and both are of chert.

Triangular end scrapers with sharp asymmetrical corners -- total 20 (Fig. 29 d, i)

These again are basically triangular in shape with straight or slightly convex sides. The distal or working edge is convex and the corners are sharp. On three, the left corner projects more or is sharper and on 17, the right corner is more pronounced. Six have the dorsal surface retouched and five are worked on the ventral surface. In length, they measure from 15.2 to 27.6 mm, in width from 12.8 to 22.5 mm, and in thickness, from 2.5 to 5.2 mm.

Expanding corner end scrapers -- total 15 (Fig. 29 g, h)

In overall shape, they have a broad straight base, concave sides and a broad and convex working or distal end. The concavity of the sides occurs near the distal corners, giving these corners a beaked or curved spur shape. On eight specimens, both corners expand out in this way, on five, only the right corner expands and on one, only the left is spurred. These specimens are not well finished, only seven being retouched over the dorsal surface and two on the ventral surface. They measure 15.2 to 27.5 mm in length; 15 to 27.8 mm in width; and 3.5 to 6.8 mm in thickness. Besides being used as a scraper, the sharp projections may have been used for gouging and grooving.

Stemmed end scrapers -- total 3

These have a convex distal or working end. The lateral edges proceed downward straight at first, but about half-way down they contract sharply and form two shoulders. The rest of the artifact is a contracting stem, with a straight and narrow base. In shape, they resemble the stemmed variety from the Cape Ray Light site. One has the dorsal surface retouched. The largest measures 29.2 by 25.7 by 5.2 mm and the smallest 22.1 by 18.5 by 4.2 mm. All three are of chert.

Notched end scrapers -- total 2 (Fig. 29 j, k)

Figure 29 k has a broad rounded distal end, two broad and deep side notches and a narrow rounded base. It has been carefully retouched over most of the dorsal surface. It measures 15 by 15.2 by 3.8 mm and is made of chert.

The other specimen, Figure 29 j, is long and spatula shaped with a rounded distal or working edge. The straight, almost parallel sides are interrupted by a pair of notches near the base. It is unifacial and

worked over most of the dorsal surface. In length, width and thickness, it measures 26.8 by 13.2 by 5 mm and is made of milky quartz.

"Nipple-edged" end scrapers -- total 4 (Fig. 29 l)

These are very small and badly made specimens; none is retouched on the surfaces. The working or distal end has a projection or sharp point near the mid-line, that gives the scraping edge a concave-convex-concave outline. In overall shape, they tend to be rectangular to triangular. Their average size is 13 by 15 by 6 mm. One is of quartz and the others are of chert.

Miscellaneous end scraper -- total 1

This is a triangular specimen that generally resembles a convex ended rounded corner type except that one corner has a deep notch. This has given the working edge a sharp spur on projection near the corner that may have been used for gouging, incising or slashing. The specimen is of chert and measures 26 by 20.8 by 5.4 mm.

Random form flakes end scrapers -- total 34

These are mostly made on rough, irregular flakes that have been minimally retouched on the lateral edges and have a good steep scraping angle on the end opposite the striking platform. Six of the specimens are of quartz and the remainder of chert.

End scraper fragments -- total 13

These are all of chert and are basal fragments, the fragmentary distal specimens being already described in the appropriate class. The bases are straight and the sides expand outward slightly, suggesting a trianguloid form for the original. Five have the dorsal surface retouched and four are worked on the ventral surface.

Concave side scrapers -- total 4 (Fig. 29 p, q)

These specimens are made on narrow microblades that are triangular in cross section. All have been retouched over the dorsal surface and the concave scraping edge has been made by steep, parallel flaking. If these scrapers are oriented with the striking platform as the proximal end and the worked surface as dorsal, then three are concave on the left edge and one has a concavity on both edges. One of the left sided scrapers (Fig. 29 q) has the scraping concavity terminating in two sharp projections, suggesting that this scraper may have been also used as a spokeshave. Lengths of these scrapers range from 28.3 to 20.6 mm (all broken), widths from 4.5 to 10.1 mm and thickness from 2.4 to 4.3 mm.

CATEGORY 4: BLADES AND MICROBLADES

Plain and retouched microblades -- total 249 (Fig. 30 a to g)

Again, as in the Cape Ray sample, blades were not separated from microblades on the basis of width. This attribute had a unimodal distribution. A similar definition of microblades and a similar rationale for a microblade industry was used as for the previous site. The results of the analysis of metric and non-metric attributes is presented in the same tables. The 75 microblades sent to McGhee (1970) were not reanalysed by the author.

The total number of microblades from the Pittman site was 249. Of these, 182 were made from chert, 51 from quartz and 16 from other miscellaneous rock types, such as quartzite and dolomite. These last were not analysed as part of the sample appearing in Table Eight. The number, then, that were analysed by the author was 107 chert and 51 quartz microblades.

A comparison of the results of the two separate analyses of chert microblades, the author's and McGhee's, firstly indicated a much greater degree of variation in my sample, especially as concerns the width, thickness, T/W index and the sum of the lateral edge angles. Two possible reasons could be advanced for this difference. The first is that the difference was caused by observer error. Since we are dealing with fairly straightforward metric characteristics, and since the system of attribute definition as outlined in Appendix I of McGhee's report was followed as closely as possible, the difference caused by the observations being made by different people should be fairly small, if not minimal. The second reason may be the manner in which the sample given to McGhee was chosen. At that point, the present author had not yet had an opportunity to carry out a detailed and final analysis of all the material from the Pittman site. The microblades that had been isolated tended to be the "best" or most regular looking ones and these were then given to McGhee. After a much more careful separation of lithic material, the category of microblades was increased by a considerable number, a lot of which were more varied and irregular and some of which were almost borderline cases. In other words, the sample given to McGhee was biased and not random. This latter possibility is more probably the cause of the difference between the two samples from the same site.

If this is the case, the two series of observations may be accepted as valid descriptions of the same sample. And since the size of the two samples is fairly close, we can estimate the variation of the entire sample of chert microblades to be approximately between the two values. It is interesting to note that mean values for both samples for such attributes as width, thickness, T/W index and platform angle are fairly close together.

The angle between the striking platform and the fluted core face, or the platform angle, is the only attribute that exhibits the same amounts of variation (c.v.) in both samples. This probably indicates that cores that produced these microblades were similar in shape.

The number of dorsal ridges on chert microblades easily satisfies Sanger's criteria of the presence of more than 25% of the non-triangular variety or those with arris numbers of two or above. Again, the discrepancy between the two samples (McGhee's sample had 18% more of the non-triangular variety) may be explained by the selection of good microblades, i.e. those with more than one dorsal ridge, for the sample sent to McGhee.

In breakage characteristics, the two samples of chert microblades from the Pittman site are much more similar than in quantitative metric attributes. The fact that proximal fragments outnumber distal fragments by at least 2½ times, seems to be a common characteristic of Dorset microblade samples, especially from the eastern Arctic (McGhee 1970:93, Table 2). The amount of variation in the length of all types of fragments is great, probably indicating that they had multiple uses both as tools as well as blanks or pre-forms for other tools. With only five complete microblades in the entire sample, a comparison of means of the length of complete blades with proximal and distal fragments is not entirely valid, but it would seem that again mean lengths of proximal and distal fragments total more than that for complete fragments. Whether this has any cultural significance or merely reflects biased sample collection of large artifacts by the archaeologist cannot be determined at this stage.

The quartz microblades are generally smaller than the chert ones. This is reflected in the smaller means of width, thickness and length. Internal variation (c.v.) for these attributes is generally similar to that of the chert ones. This may indicate that even though raw quartz

crystals were used as cores, their natural angles and facets were ignored and cores were made from these that resembled the kinds of cores made from chert. The closeness of the platform angles and the angles of the left and right lateral edges further seems to confirm this observation. One disturbing feature about the quartz microblades is the fact that only 18% are non-triangular. Does this mean that there was no quartz microblade industry present at the Pittman site? The presence of quartz polyhedral, microblade cores indicates otherwise. The reason for this may involve the smallness of the size of the quartz sample, or some as yet unknown aspect of technology in producing blades of sufficient width to encompass more than one dorsal ridge. Perhaps quartz cores, which are probably smaller to begin with, develop sharply angled ridges on the blade removal surface that allows only triangular blades to be produced when the core is close to exhaustion. In other words, the suggestion is presented that the 25% rule may not have significance for a quartz microblade industry.

The manner in which quartz microblades were broken generally resembled the chert sample. There were about seven times more proximal fragments than distal ones. The amount of variation in the length of fragments, including medial ones, was large and much greater than in the chert sample. This may mean that quartz microblades had even a wider range of uses than chert ones, or, since they were considerably thinner, may have broken more easily either during manufacture or while being modified or used.

The common method of platform preparation and platform edge modification was by chipping and battering, for both chert and quartz microblades. Of the 53 chert platforms present, 81.5% were prepared in this manner, and 18.5% had used a straight break on the nodule or had used

the cortical surface as the platform. A very few of these had slight amounts of grinding present, especially over a previously roughened or chipped area. In the sample of quartz microblades, 29 had striking platforms. Of these, 96.5% were prepared by chipping and/or battering and 3.5% were not prepared or their method of preparation could not be determined.

Retouching on either the distal or proximal ends of both chert and quartz microblades occurred very infrequently at the Pittman site. Only three chert blades were retouched in these areas, one on the proximal end and the other two on the distal end. The only quartz microblade of this type was retouched on the proximal end.

Lateral edge retouch was analysed in a manner similar to that used in the Cape Ray sample. Retouch was considered to be that edge modification that could be seen by the eye alone, and that was continuous and regular enough to rule out at least some natural agencies. Again, no attempt was made to separate out specialized types of retouch such as proximal tangs. Microblades that had obviously been used as preforms for other tool categories, such as concave side scrapers, unifacial knives, perforators, etc., will be described later in the appropriate sections. Twenty-one chert and eight quartz microblades were laterally retouched. As would be expected with this much smaller sample of retouched blades, variation in the location and type of retouch was somewhat less than in the larger Cape Ray sample. Bilateral retouch on alternating surfaces occurred in only two cases. Bilateral retouch on one surface occurred in 11 cases, nine of these on the dorsal surface and two on the ventral. In the Cape Ray sample, the dorsal surface was also highly favoured over the ventral in unifacial bilateral retouch. The remainder of the retouch in the Pittman sample was unifacial and unilateral. On eight microblades,

it was located on the left edge, dorsal surface, on six on the right dorsal, and on two on the right ventral. The left dorsal location was also very popular for unifacial, unilateral retouch in the Cape Ray sample. As a summary of the entire sample, only two had bifacial retouch while 27 were unifacial. This probably indicates that retouching was not carried out to obtain a sharp cutting edge, which the microblade already had, but probably to blunt areas to reduce or to change size and shape to facilitate hafting.

Microblade ridge flakes, core face detritus and preparation material -- total 249 (Fig. 30 h to m)

The material from the Pittman site was also rich in ridge flakes, cortex flakes, steep-edged blades and core face detritus. It seems that methods similar to those used at the Cape Ray Light site were used here in the production of microblades.

There was a total of eight primary ridge flakes (Fig. 30 h, i). Three of these were of quartz and these tended to be shorter and narrower than the chert ones. The chert ridge flakes were in the top range in the length of the complete microblades. All were heavily battered along a sinuous dorsal ridge, which had obviously been used as a striking platform for the transverse flakes that had been removed from the dorsal surface. None had been used or retouched.

Secondary ridge flakes of form A numbered 48, 47 of chert and one of quartz (Fig. 30 k). These were flat, thin flakes with large transverse flaking scars over most of the dorsal surface. Some of these showed some heavy battering near the dorsal ridge and may have originated quite close to the ridge of the primary flake.

Form B secondary ridge flakes numbered 52 (Fig. 30 m), and five

of these were of quartz. These flakes are much thicker than the form A ones and more definitely triangular in cross-section. Very often one part of the dorsal surface has a longitudinal scar from the previous removal of a microblade or ridge flake. A few of these had been slightly retouched along the lateral edges, but retouch on ridge flakes was much less common than at the Cape Ray Light site.

Steep-edged flakes also occurred at the Pittman site. Again, it was hard to determine whether these were true microblades or the result of core preparation or rejuvenation. They resembled microblades in that the dorsal surface had no transverse flaking, but had one ridge and two longitudinal blade scars. One dorsal surface, however, was extremely steeply angled and narrow, while the other tapered slowly to a somewhat irregular edge and was very thin. As in the Cape Ray sample, these may be unsuccessful microblades, ridge-spacing flakes, or just generally core face leftovers. None of these were retouched.

Core preparation flakes with at least one surface containing cortex numbered 55 specimens. Many showed longitudinal scars from the removal of microblades or ridge flakes and all were linear in shape. Therefore, they probably relate to microblade cores and probably to the initial stages of the production of microblades. Several of the quartz ones have the natural faceted surface of the raw crystal present, indicating that the angle of these facets were not always usable as guides for microblade ridges. Three of the cortex flakes showed slight use wear along the lateral edges. Seven were more definitely retouched, one perhaps functioned as an end scraper and another had an incipient stem, but no other retouching or use wear. The remaining five were irregularly and unifacially retouched on the lateral edge perhaps as flake knives.

There was also 40 pieces of core face detritus, five of these of

quartz. Some are thin flakes that are linear in shape, but have irregular dorsal ridges or parts of basal portions of cores present. Others are simply core face shatter, some with substantial areas of the striking platform and extensive areas of the fluted or polyhedral core face still present. Only one of these has been retouched, and then only slightly along one lateral edge.

In summary, the Pittman microblade and core preparation material generally resembles that from the Cape Ray Light site as well as other Dorset samples from the Arctic. The differences between the two sites could be caused by the differences in the size of the samples. Again both chert and quartz were the raw materials most utilized for microblade production. The quartz microblades tended to be a little smaller than the chert ones. The higher frequency of triangular blades in the quartz sample, higher both in relation to chert microblades as well as to quartz ones from the Cape Ray Light site, may reflect the size of the quartz raw material available at the Pittman site. But, on the other hand, the size of the microblades produced is approximately the same for the two sites. Perhaps the difference is due to cultural preference rather than to limitations of raw material.

There was much less variation in how the lateral edges were retouched at the Pittman site, but then the number of retouched microblades was much smaller. Even so, unifacial retouch greatly outnumbered bifacial. Again, retouch seems to have had the purpose of blunting the edge, rather than sharpening it. The location of lateral blunting in the proximal area indicates a preponderance of end hafting over side hafting.

CATEGORY 5: CORES

Triangular microblade core -- total 1 (Fig. 31 d)

This is a small quartz specimen. It has a rectangular, flat striking platform, measuring 10.2 mm by 15.4 mm and prepared by shallow flaking. The fluted surface extends from the short axis of the platform, at 45°, to a ridged base. The side opposite the core face converges at about the same angle to meet the basal ridge. The lateral sides are untouched cortex from the original faceted surface of the quartz crystal. The fluted surface has the remains of four or five scars from the removal of microblades, all very narrow, not measuring over 2 mm in width. The overall height of this core is 8.5 mm.

Cuboidal or rectangular microblade cores -- total 3 (Fig. 31 e, f)

These cores have generally straight sides, and a flat striking platform and base. The sides all tend to meet each other at right angles, hence giving the specimens their overall cuboidal shape. The striking platforms are rectangular, varying in size from 28.6 by 12.8 to 24.2 by 10.2 mm. The surface where microblades have been removed is always along one of the short axes of the platform. The platform angle varies between 80 and 85° and the platform is prepared by flaking and there is battering along the platform edge. Microblade removal scars usually do not exceed three in number and they vary in thickness from 2.2 to 7.5 mm. These scars extend down the entire length of the core, which ranges from 21.6 to 46.7 mm. Two of these specimens are of chert and one is of greyish, milky quartz.

In comparison with Cape Ray rectangular cores, these are now irregular in shape and thinner.

Ridged platform microblade cores -- total 4 (Fig. 31 c, g)

These are all small and made from quartz. There is no real striking platform in the sense of a flat area, rather the microblades have been removed along a battered ridge. One surface forming this ridge is, then, the fluted surface and the other surface has a few short flakes taken off near the ridge. These two surfaces expand, at an angle that varies from 45 to 55°, until they meet a straight, flat base. The base of the largest measures 11 by 12.4 mm and this specimen is 16 mm high, while the smallest, a very narrow crystal, measures 6 by 7 mm at the base and is 19 mm high. The lateral sides and most of the side opposite the fluted face retain the original cortex and facets of the crystal. The fluted face has many narrow blade scars that extend along the entire length of the core.

Discoidal microblade core -- total 1 (Fig. 20 c)

This core has an ovoid, flat striking platform that measures 22 by 35.5 mm. Microblades have been removed from both the shorter arc and longer arc of the platform. Each of these has three scars that are fairly broad, ranging from 4.5 to 8 mm. The sides of this core are gently convex and converge to a flattish, oval base that measures 16.1 by 27.2 mm and is at a distance of 21 mm from the striking platform. The angle between the striking platform and the worked core face varies; at the short side it is 65° and at the long side of the platform it is 85°. This specimen is made from a greyish, milky quartz.

Random form microblade cores -- total 2

Both these are of quartz and are generally irregular but tend to be cuboidal in shape. Both of these have a flat platform that is almost square and a fluted surface that meets the platform at between 70 and 75°.

The surface opposite the fluted surface extends straight down about halfway and then converges sharply towards the opposite side, meeting it at a ridge. The lateral sides are straight and consist of the unworked cortex of the crystal. Their platforms measure 13 by 12 mm and 13 by 10.2 mm and they range in height from 15 to 20.2 mm.

Microblade core fragments -- total 18

These are all thick, irregular fragments from the fluted faces of microblade cores. Some of them retain a considerable amount of the striking platform. Six of the fragments are of quartz and seem to be from rectangular cores, as the angles of their striking platforms are close to 80^{o}. Of the 12 chert specimens, six also have large platform angles and seem to belong to rectangular cores. Two appear to be of the ridged platform variety while the others are not identified by shape.

Blanks for microblade cores -- total 30 (Fig. 31 h, i, j)

This group consists of raw and minimally worked quartz crystals as well as chert and quartz specimens that have been roughly shaped. In the latter group, there are seven chert and three quartz specimens. All of these have some kind of minimally prepared, flat striking platform. Six of them have a rectangular shape, three are triangular and one is tabular with one of the broad surfaces having part of one microblade scar present. The rectangular ones are generally larger measuring 17.2 by 25.3 by 30.5 mm and the smaller triangular ones measure 8 by 10.1 by 13.8 mm on the average.

Five quartz crystals may be core blanks. They have one tip flaked bifacially to a broad ridge and resemble either the ridged platform or triangular variety of core. There are also 15 raw or unretouched quartz crystals that have the potential of being used as cores or at least raw

material for artifact manufacture. Some of these are narrow and long, being 7 mm in diameter and 21 mm in length while others are broader, being 17 mm in diameter and 29 mm in length.

Flake cores and fragments -- total 28

Fifteen of these seem to be complete cores. They have more than one surface flaked, and usually these surfaces are adjacent to each other or they have several flakes removed from the same surface and striking platform. These features separate them from irregular shatter. On most the platforms are not prepared, but flat breaks or cortex surfaces. Among these rather random shaped cores, appear to be a special type that resembles a thick, ovate biface that has been broken in two. Six of the specimens belong to this group. The flat break has been used as a striking platform in some instances, with varying numbers of flakes removed from one of the broad surfaces. The platform angle for these is between 80 and 85^{0}. The flake cores as a whole vary in size from 14 by 27 by 25 mm to 18 by 56 by 37 mm. There are also 13 fragments, eight of chert and five of quartz, that seem to be from flake cores.

CATEGORY 6: SOAPSTONE

The total soapstone sample from the Pittman site consisted of 55 pieces. Of these, 18 were analyzable and 37 were so badly eroded or so small that they were of minimal utility and were not included in the analysis. There was much less soapstone at this site than at the Cape Ray Light site and the raw material used seemed to be of much poorer quality. A similar descriptive system will be used for this site as for the former.

Rectangular vessels -- total 6 (Fig. 32 c, d)

There were four pieces representative of the larger type of rectangular vessel. One of these, part of the largest vessel in the sample, has two sides with rims that formed a corner, but no base remained (Fig. 32 d). The rim was bevelled on the exterior, and had a fairly thick lip that measured between 5 and 6 mm. The angle of the corner is 114°, and the top or rim part of the corner is inturned by a short, flat bevel. The external edge of the corner was also truncated by a broad bevel. The length of the longest remaining side is 173 mm and the average maximum thickness of the sides is 11 mm. The long side is slightly curved along the cross axis. There is a suspension hole near the rim that measures 19.7 by 8.4 mm. Another, much smaller hole, is near the edge of a break and was probably used for patching. Both holes had small grooves leading from them, probably to countersink the lashing and the suspension thong.

The other three pieces are smaller and less complete fragments. One is a side with a rim and just the trace of base and a corner. The rim is bevelled and 5.6 mm thick at the lip. The side is 8.1 mm thick at the base. The second is a thick sherd with the beginning of a corner. It is 18.3 mm thick and may be a basal fragment. The last is just a rim fragment, but by its thickness, 21.1 mm, is probably from a large vessel.

Two pieces seem to belong to smaller vessels. One vessel (Fig. 32 c) has two complete sides, half of a third side and part of the base. No rim areas are, however, present. This is a thick-walled vessel with almost perpendicular sides. Its external length is 91.4 mm and its width, 78.8 mm. The sides are 14.9 and 18.2 mm thick at the base, and the vessel was at least 64 mm high. The basal corner angles are 92 and 90° and the slope of the three sides is 7, 10 and 11° respectively. The external corner edges are somewhat eroded but appear to have been sharp. The other

vessel fragment has part of the base and one corner. The rim is badly deteriorated. The sides are about 68 mm high and 7.2 mm thick at the base. The base itself is very thick, at 20.4 mm. The sides slope out quite a bit, at 46 and 37°, but are symmetrical in slope. The angle of the basal corner is 112°, indicating that this vessel may not have been rectangular.

There are no small, thin vessel fragments in this site sample. This may be because of the small size of the sample or due to the fact that the soapstone here is of such bad quality that very small and especially thin pieces were probably hard to manufacture.

Rounded specimens - total 2 (Fig. 32 a)

There are two round fragments in the sample. Both are small and very thick and badly eroded. One (Fig. 32 a) has a definite curve on the outside and is more angular on the interior surface. The other seems to be the bottom of a corner, with the external surface rounded. One is 13.7 mm and the other is 25.8 mm thick.

Miscellaneous pieces and fragments -- total 8 (Fig. 32 b)

Only one piece in the entire sample is of good, hard and dense steatite. This seems to be a reworked and unfinished vessel fragment (Fig. 32 b). It is a flat slab with three edges finished by a double bevel. One surface is definitely in the process of being worked. It has a series of deep grooves that converge towards a lump or knob that is higher than the surface. The width of these grooves vary from 2.5 to 5 mm, and they could have been made by an end scraper. The piece itself measures 108.6 by 84.9 mm and is 16.5 mm thick. Another fragment with working marks still on it is a rim sherd, and it has two deep narrow grooves on the exterior, perhaps to cut this piece to a different size to make another artifact. The grooves show many long, horizontal striae within them, and they may also have been used for thong strapping.

The eight remaining fragments all have the rim present and four have bases and corners as well. Six of the rims are bevelled on the exterior, with an angle of 22 to 43°. The length of this bevel is about 9.6 mm for three, while on one it is 22.4 mm long. The tops of these bevelled rims are flat and horizontal and measure between 3 and 6.5 mm. One rim is rounded on both surfaces and along the lip. The basal fragments are badly eroded, but one was 20.6 mm thick. The angles of the basal corners again in two cases were more than 90°. One fragment had an angle of 115° and the other 120°. These again may belong to other than rectangular vessels. Where external corners and edges could be analysed, four vessels were truncated, two were straight and one was rounded.

Many of the soapstone pieces from the Pittman site are badly pitted, eroded and deteriorated, but the following traits appear to characterize it. A high proportion of the pieces, 13 out of 18, belong to vessels of the rectangular variety; two pieces are from round vessels; and three pieces, with basal corner angles greater than 90°, may belong to vessels of a trapezoidal or rhomboidal shape. Whether these latter specimens are cooking vessels or lamps remains indeterminate at this point. The rectangular vessels appear to be very similar to those from the Cape Ray Light site; however, at the Pittman site there are no pieces of the very small and thin variety. Also, only one sherd has patching or suspension holes and the bar-and-slot type of repair method is entirely absent. This may be due to the much smaller size of the soapstone sample from the Pittman site.

During the 1967 field season, a visit was made to Fleur de Lys, on Baie Verte, about 35 miles by sea from Sop's Island. This short excursion was an attempt to locate a soapstone quarry that had been reported both by Howley (1915, Plate XXXII) and by Wintemberg (1939 Part II: 319). The quarry was easily found, as the local residents are aware of its existence, and have apparently been using it for their own purposes. Several areas

have initials and dates incised into the surface as well as some quite well executed pictographs of sailing and sealing ships.

The quarry is located quite close to the present day road leading to the town of Fleur de Lys about a mile outside the town. It consists of an irregular, perpendicular cliff about 60 feet long and 25 feet high. The exposed surface of the rock outcropping is more or less covered by rectangular and oval lumps or "buds" that have been made to roughly outline the size of pieces thatwere to be removed (Fig. 11 d). These knobs, as well as the scars remaining from their removal, measured from 14 to 1.5 inches in diameter and were from 2 to 4 inches high. A count of the scars and unremoved lumps gave a total of about 270. The base of the cliff was littered with broken pieces and fragments of soapstone as well as small, water washed oval cobbles. Several of these showed extensive pitting and battering on the narrow ends, as if they had been used for bashing and hammering.

This proved to be a quarry for the purpose of obtaining soapstone and it seems to have been extensively used in the past. No artifacts or other material was found to establish the dating of the prehistoric use of the quarry. The nature of the soapstone indicates that it may have been used by the Dorset peoples of the Pittman site. A minerological comparison of the soapstone from the site and the quarry has not been completed, but hopefully these results will be available in the future.

The soapstone from the Fleur de Lys quarry is very soft, pitted and full of impurities and does not resemble that from the Cape Ray Light site. This latter site and the quarry are separated by about 200 miles and it seems very unlikely that the Cape Ray people obtained their soapstone from Fleur de Lys.

CATEGORY 7: BLADE AND FLAKE TOOLS AND USED FLAKES

Bifacial flake knives -- total 16 (Fig. 33 a, b, c)

These specimens are thin, well-made burins. Two are elongated, concave-based and have asymmetrical edges. Both have the distal areas missing. Another specimen has a broad square base and the lateral edges taper to a rounded distal end. Thirteen specimens are thicker and strongly biconvex. They also have convex bases and convex sides and are leaf-shaped (Fig. 33 a, b). Specimens of this last group are much more roughly chipped and have a more irregular surface than the first three. The largest measured 58.7 by 34.8 by 16.4 mm and the smallest 34.7 by 23.4 by 8.8 mm. One specimen was quartz and the others were of chert.

Bifacially retouched flakes, random form knives -- total 21

These specimens have one well retouched cutting edge but no other deliberate shaping of the artifact. Most are made on fairly regular thin flakes while several are thicker and more irregular. The worked edges are straight and sharp and these specimens were probably used for cutting. The smallest is 25.3 by 19.9 by 5.9 mm and the largest is 40.5 mm wide and has a broken length of 43 mm. All these specimens are of chert.

Flakes with minimal bifacial retouch -- total 28

These specimens vary from large and thick irregular flakes to thin, and small flakes. The amount of retouch varies but is minimal and confined to one edge. None are retouched on the surfaces. Twenty-five are of chert and three of dolomite.

Bifacially retouched fragments -- total 27

These fragments are too small to be assignable to any class, but all have a bifacially retouched edge. Three are of quartz and the remainder are of chert.

Unifacial flake knives -- total 8 (Fig. 33 d, e, f)

There is some variation in shape within this class. Four specimens are rectanguloid or ovate in shape and two of these have small incipient notches near the base. The retouching on these specimens varies from edge shaping to retouching over the entire dorsal surface. Three specimens are stemmed. These are all basal fragments and seem to be made on blade-like flakes. Retouching is confined to shaping of the edges. The remaining specimen is a tip fragment from a large, leaf-shaped unifacial tool. It is carefully retouched over the entire dorsal surface. Of the complete specimens the smallest is 21.8 by 8.2 by 3 mm and the largest is 28.8 by 14.4 by 4.2 mm. One specimen is of quartz and seven are of chert.

Unifacially retouched blade tools -- total 9 (Fig. 30 a, b)

These specimens have been shaped by both lateral edge and dorsal retouch to form a variety of tools. One specimen is the tip end of a perforator (Fig. 33 b). The edges and dorsal surface have been retouched to produce a sharply converging distal end that terminates in a sharp point which could be used for gouging holes as well as incising and grooving. Three specimens have a concave working edge. Two of these have a single concavity along one lateral edge. The narrowness of the concavity and the shallow nature of the edge retouch seem to exclude these specimens from the category of scrapers. They may have been small spokeshaves. The other concave-edged artifact has three small concavities along one edge. These are broad and shallow and give the artifact the appearance of a denticulate tool. The remaining five unifacial blade tools appear to be knives. They have extensive shallow retouch along both lateral edges. All blade tools in this class are retouched on the dorsal surface of the original blade or microblade. All specimens are of chert.

Unifacially retouched flake perforators -- total 24 (Fig. 33 i to l)

On 20 of these specimens the naturally pointed part of the flake has been used as the working edge. The bit or tip area has extensive use or wear marks. Three have a deliberately made notched or beaked bit. This has usually been formed by the removal of one flake along the lateral surface near the tip. The remaining perforator has a long tapering end that has been formed by deliberate lateral retouching. The point is sharp and has been well used. There is much size variation within this class. The smallest measures 23 by 13.8 by 2.5 mm while the largest is 65.5 by 25 by 13.5 mm. Two specimens are of quartz and 22 are of chert.

Unifacial edge retouched tools -- total 37 (Fig. 33 g, h)

Eighteen of these seem to be like random form scrapers, as they have one lateral edge steeply but irregularly retouched. Another 18 have a much more shallow retouched edge and appear to have functioned as knives. One specimen has a slight concavity worked into one lateral edge and may have been a spokeshave. All these specimens are characterized by very irregular and minimal retouching. The largest measures 41.3 by 27.7 by 10.3 mm and the smallest is 16 by 9.8 by 2.4 mm. Thirty-one are made of chert, five of quartz and one of dolomite.

Minimally retouched flakes -- total 33

A variety of flakes belong to this group. Most are thin and flat but a few are thicker and more irregular. In size they do not seem to vary too much and average 29 mm in length and 19 mm in width. Most of the retouching is restricted to small areas of the lateral edge. Most of the retouched edges are straight, a few are slightly concave. Their function seems to be general purpose cutting and sawing tools. Four specimens are made of quartz and 29 of chert.

Edge used flakes -- total 89

Again this group encompasses a variety of flake shapes, ranging from thin, flat flakes to thick, rectanguloid ones. Seventy-one specimens have been extensively used, either heavily in one area or on more than one edge. The remaining 18 have only minimal use wear that is restricted to small areas. All specimens are of chert.

CATEGORY 8: ROUGH STONE

Since this category contains specimens that are not culturally diagnostic, only those artifacts that were found in the undisturbed layer of the Dorset component have been included here. Others were found on the surface and in the undisturbed topsoil layers of the site and since their cultural context cannot be determined, they could also belong to the Archaic component on the site.

Choppers -- total 2 (Fig. 34 b)

Both specimens are made from fine grained pinkish quartzite pebbles. Both have considerable amounts of cortex remaining on the surface and the retouched ends have been flaked bifacially. One has a pointed end and the other a straight, sinuous cutting edge. Both range in size around 110 by 70 by 40 mm.

Abraders -- total 2 (Fig. 34 a)

Figure 34 a is a long and rectangular specimen that seems to have been part of a naturally flat piece of sandstone. Both of the narrower sides have grinding facets and there is one narrow ground bevel at the junction of two of the surfaces. This specimen is 184 mm long, 51.1 mm wide and 43.5 mm thick. The other specimen is a mid-section fragment of

an abrader. It has two flat surfaces and two rounded sides. One of the flat surfaces and both of the sides are polished while the other surface is broken and rough. This may also be a fragment of an adze or gouge. It is 49 mm wide and 17.6 mm thick.

CATEGORY 9: DEBITAGE -- TOTAL 6,011

As for the Cape Ray Light site debitage at the Pittman site consisted of large and small fragments of shatter, irregular and fragmentary unused flakes and small retouch chips. Again raw material was divided into the three groups of chert, quartz and other. Within the undisturbed occupation layer of the Dorset component in Area J about 79% of the material was chert, 11% quartz and 10% of other stone. The lower percentage of chert and the higher percentage of other stone at the Pittman site reflects the use of dolomite that was easily obtainable just north of the site. Also such local rock as granite, basalt and sandstone were represented in small numbers. The type of chert at the Pittman site is of a different colour and texture than at the Cape Ray Light site. The chert is usually dark grey to black, has a shiny luster and is slightly translucent. Only a few pieces are light in colour. The source of this chert has not been located. The Spear Point geological formation, which is located between Sop's Arm and Hampten along the west coast of White Bay and within a few miles of the site, does contain nodular chert elements as well as cherty shale (Heyl 1937:13) and this may have been the source of this raw material. Table Twelve outlines the distribution of debitage for Area J for both the disturbed and undisturbed layers. The material from the undisturbed layers belongs to the Dorset component of the site, while that from the disturbed layers may be mixed with the Archaic component. The density

TABLE 12

DISTRIBUTION OF DEBITAGE
PITTMAN SITE - AREA J

Undisturbed level IV:

Chert	Quartz	Other
2,980	428	381
78.7%	11.3%	10.0%

Total: 3,789

Disturbed levels:

Surface			I			II			III			Total		
Chert	Quartz	Other	C	Q	O	C	Q	O	C	Q	O	C	Q	O
241	60	174	383	90	51	832	201	145	28	4	13	1484	355	383

Total: 2,222

Total for all levels:

Chert	Quartz	Other
4,464	783	764

Overall Total: 6,011

of material from the Dorset component in Area J is about 16 pieces per square foot. This is almost at the half-way point between the maximum and minimum densities of debitage for the Cape Ray Light site.

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FIGURE 15 - Cape Ray bifacial end blades

a to f - triangular

g to l - side-notched

m to q - asymmetrical

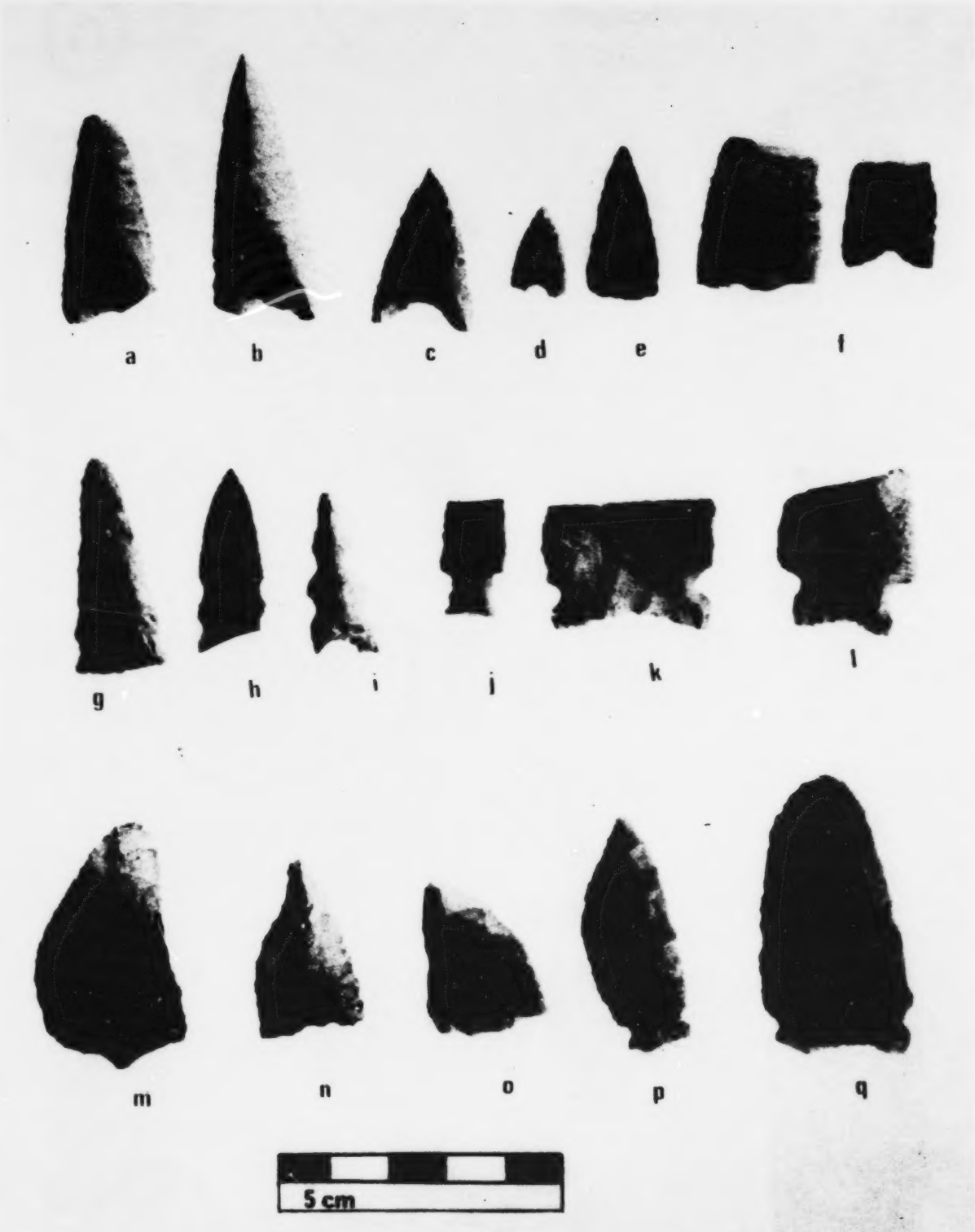


Figure 15

FIGURE 16 - Cape Ray, ground slate

a - thin tapering object, use unknown

b,c - gravers

d - ground and chipped adze

e,f - notched end blades

g - scraper/adze

h,j,k - large end blades

l - ground and chipped end blades

Figure 16

FIGURE 17 - Cape Ray end scrapers

a,b - "nipple" edged

c,d - notched

e - stemmed

f - triangular, symmetrical corners

g - triangular, rounded corners

h - triangular, straight edged

i - miscellaneous form

j - quadrangular

k,l - end-of-blade

m - expanding corner

n,o - triangular, sharp asymmetrical corners

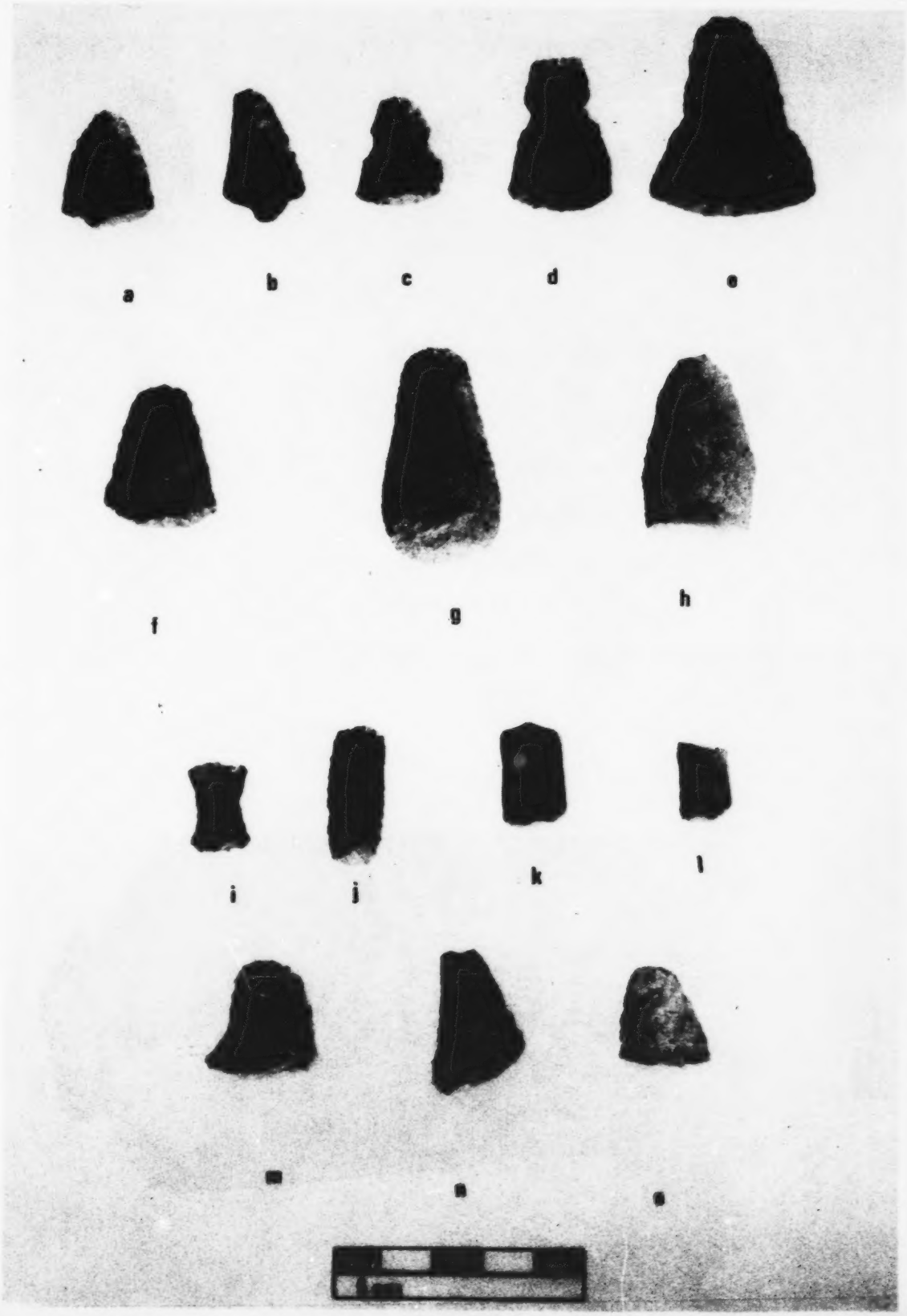


Figure 17

FIGURE 18 - Cape Ray Light Site

a - side blade

b,c - burin-like tools

d to f - concave side scrapers

g - worked flake, unifacial

h to k - unifacial knives

l - ground slate, bevel-edged knife

Figure 18

FIGURE 19 - Cape Ray, microblades

a to f - microblades

g to i - retouched microblades

j to m - secondary ridge flakes

n, O - primary ridge flakes

p - core face detritus

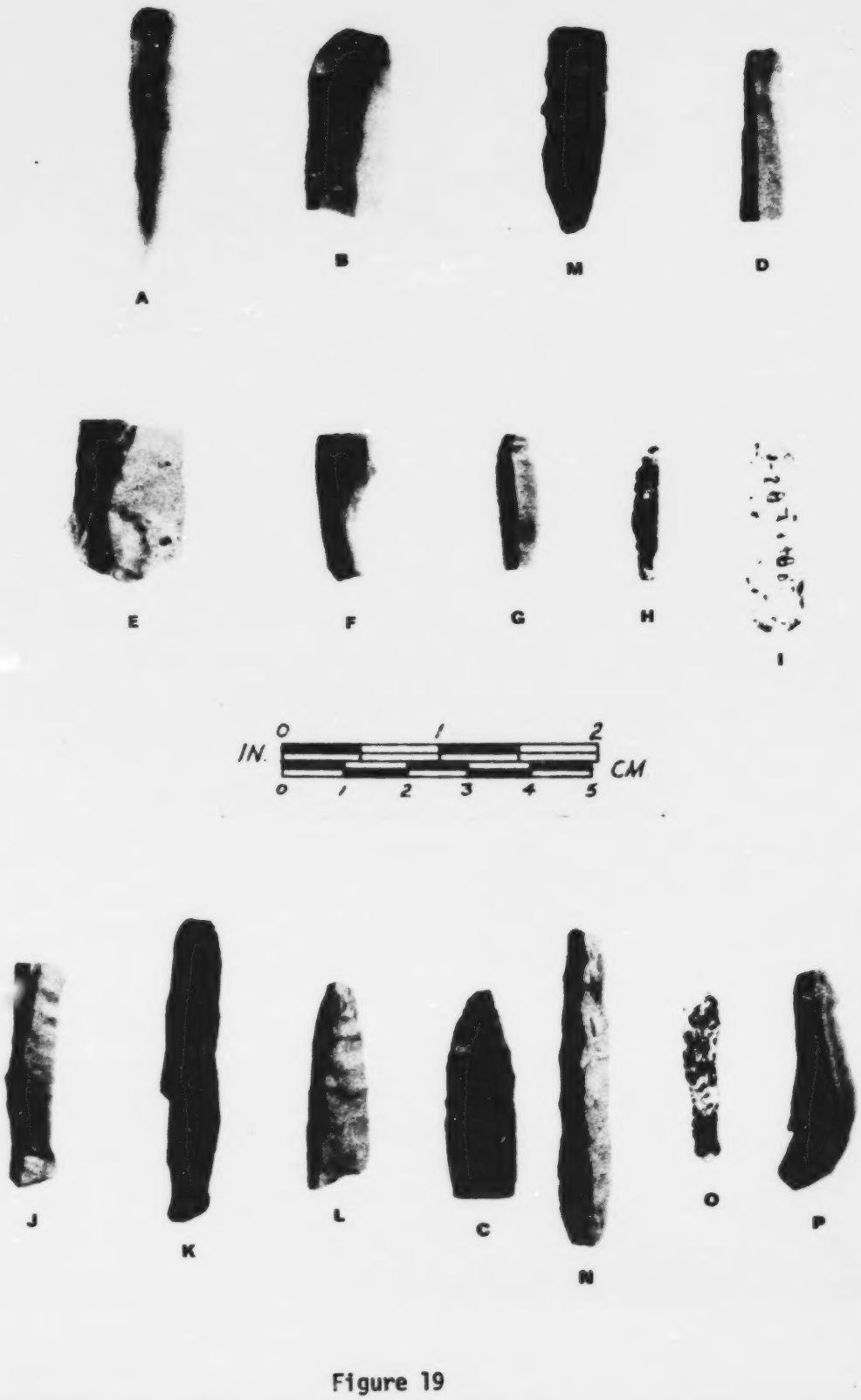


Figure 19

FIGURE 20 - Cape Ray, cores

a - conical

b,e,f - cuboidal or rectangular

d,i,j,k - triangular

g,h - quartz crystal core blanks

Pittman site, core

c - discoidal

Figure 20

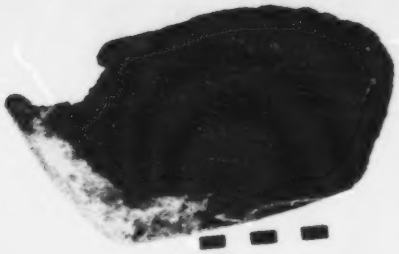
FIGURE 21 - Cape Ray, soapstone vessels

a to d - rectangular vessels

e - triangular vessel

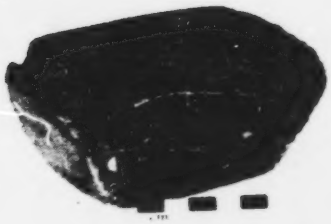
f - rounded vessel

a



b

c



d

e

f

Figure 21

FIGURE 22 - Cape Ray, soapstone

a - vessel fragment reworked into a slab

b - fragment with patching bar in place

c - fragment reworked into a slab with a bevelled edge

Figure 22

FIGURE 23 - Cape Ray, soapstone

a - disc

b - fragment with lug

c - fragment with incised slot

d - fragment showing shallow working grooves

e - fragment with deep incised working grooves

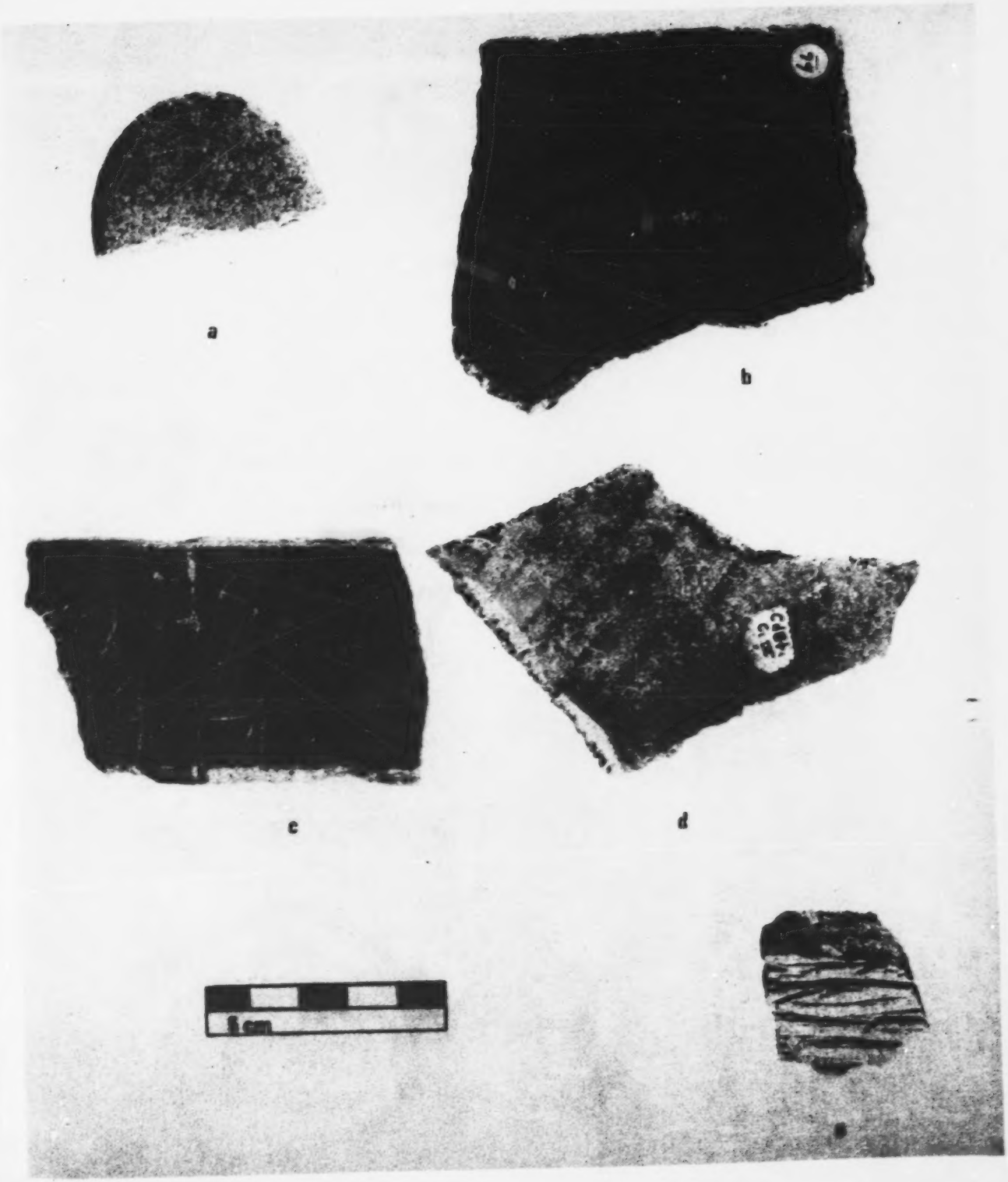


Figure 23

FIGURE 24 - Cape Ray, flake tools

a to c - thick bifaces with sinuous edges

d to f - bifacial flake knives

g,l - bifacially retouched flakes, random form knives

h to k - unifacially retouched tools, perforators

Figure 24

FIGURE 25 - Cape Ray, rough stone tools

a,b - stone choppers

c - hammerstone

d,e - oval wedges

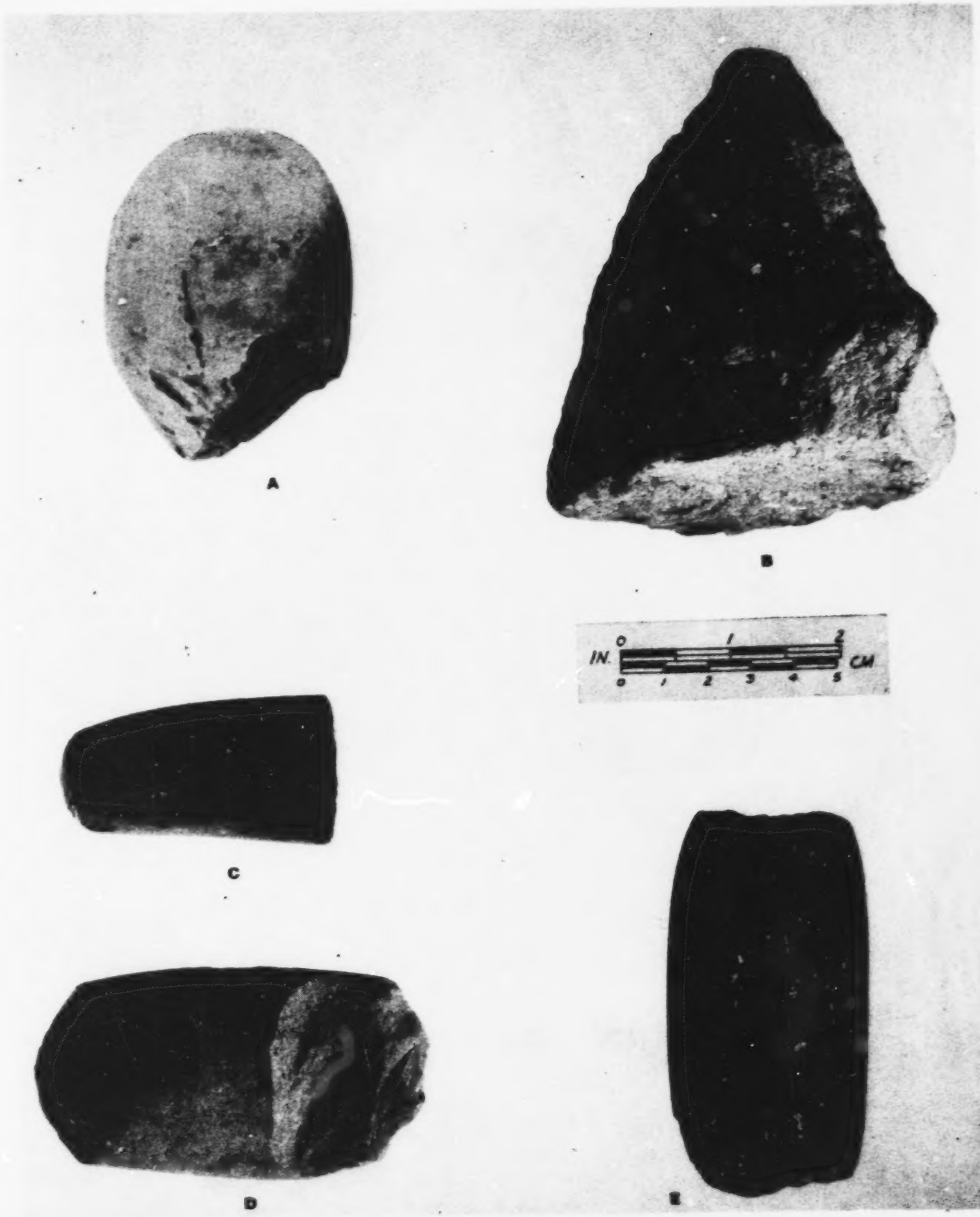


Figure 25

FIGURE 26 - Cape Ray Light Site

a - abrader

b - worked sandstone slab

c to e - flake cores

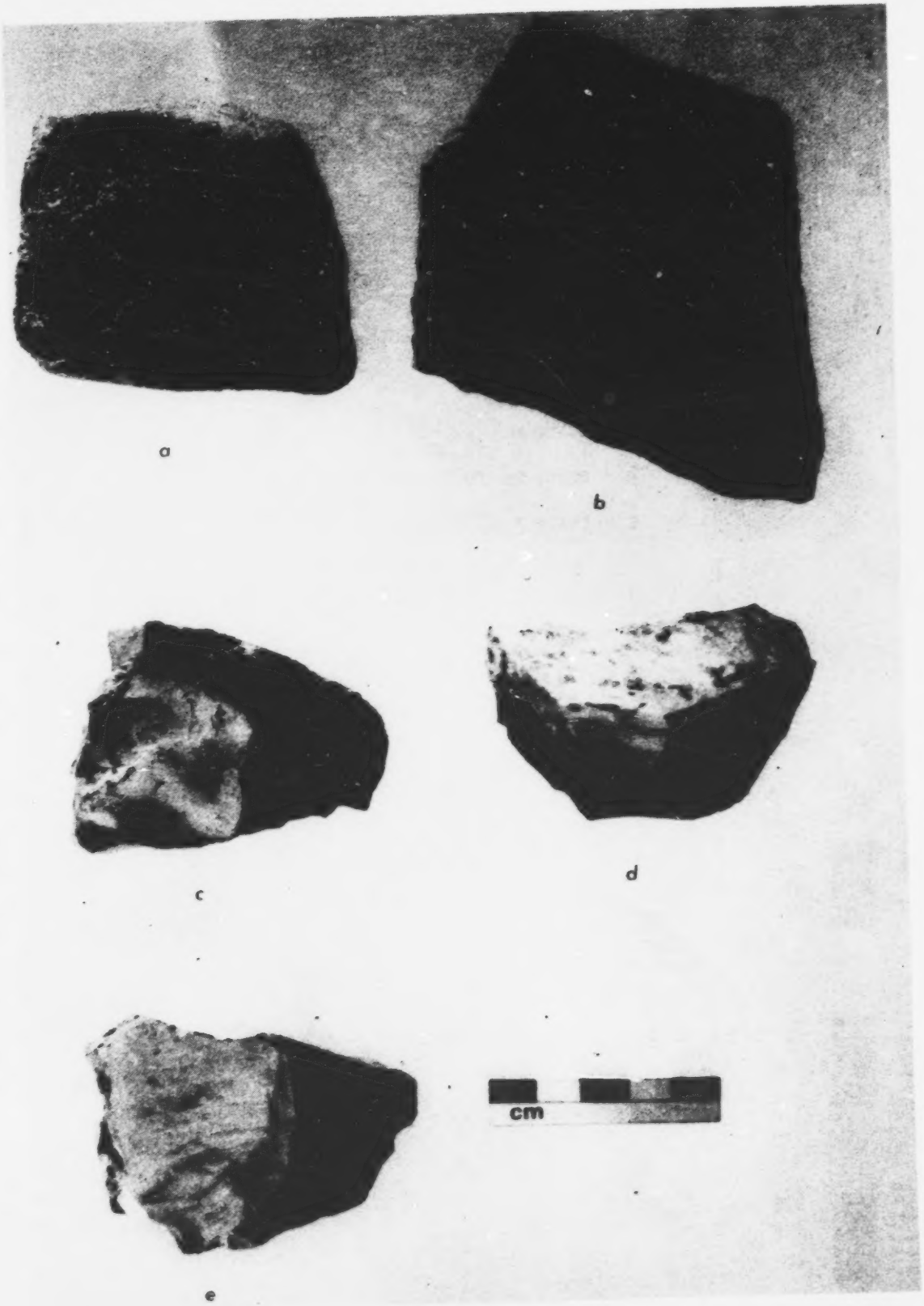


Figure 26

FIGURE 27 - Cape Ray Light Site

a - cordage

b - engraved soapstone disc

c - heavy maul

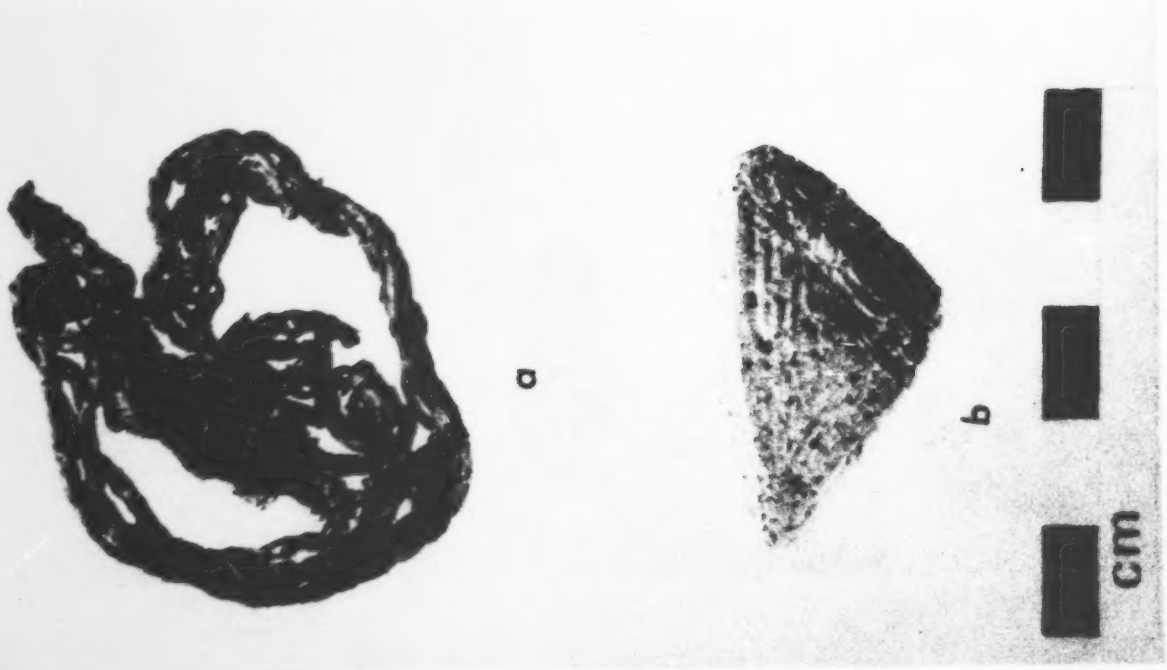


Figure 27

FIGURE 28 - Pittman Site, end blades

a to g - triangular

h to n - side-notched

o to q - asymmetrical

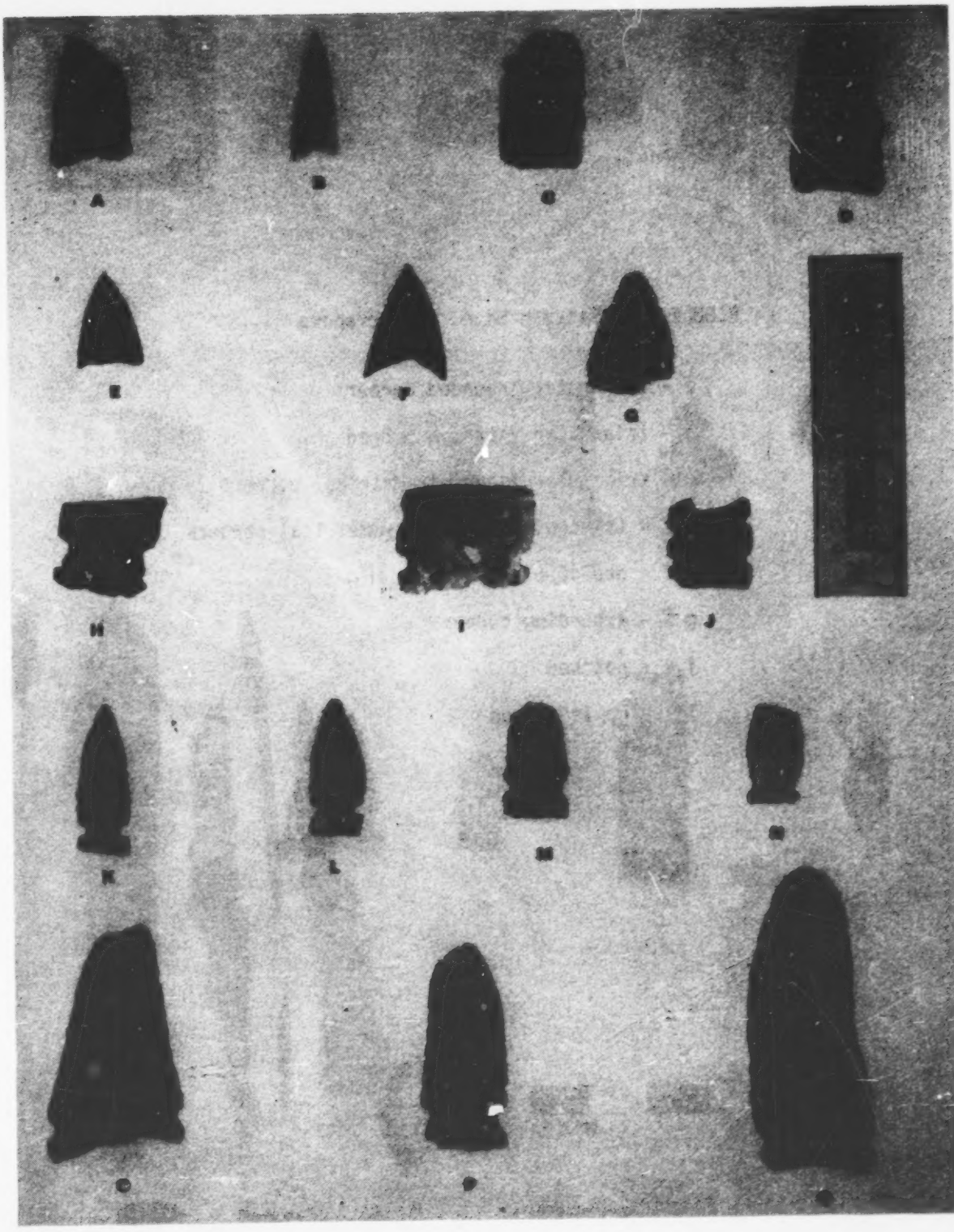


Figure 28

FIGURE 29 - Pittman Site, end scrapers

a - triangular, rounded corner

b - triangular, straight edged

c - triangular, sharp symmetrical corners

d,i - triangular, sharp asymmetrical corners

e,f - end-of-blade

g,h - expanding corner

j,k - notched

l - "nipple" edged

Figure 29

FIGURE 30 - Pittman site

a to g - microblades (blades)

h to j - primary ridge flakes

k to m - secondary ridge flakes

o - ground slate adze

p - ground slate end blade, notched

Figure 30

FIGURE 31

a - microblade, from DkBe.2

b - end blade, from DkBe.2

c,g - ridged platform microblade core, Pittman site

d - triangular microblade core, Pittman site

e,f - cuboidal (rectangular) microblade cores, Pittman site

h to j - quartz crystal core blanks, Pittman site

k - ground slate point, Archaic component, Pittman site

Figure 31

FIGURE 32 - Pittman Site, soapstone

a - rounded vessel fragment

b - miscellaneous piece, showing working scars

c,d - rectangular vessel fragments

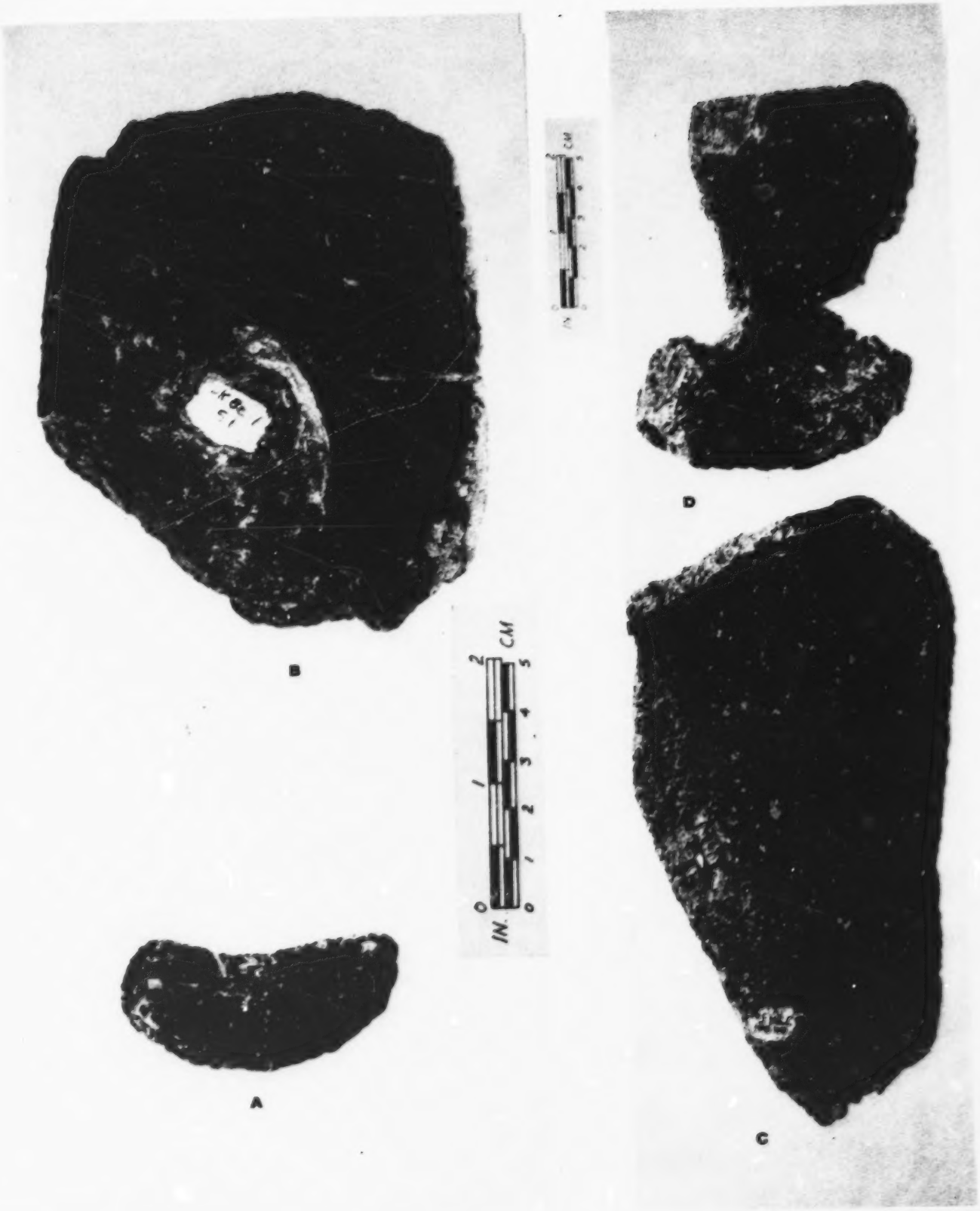


Figure 32

FIGURE 33 - Pittman site, flake tools

a to c - bifacial flake knives

d to f - unifacial flake knives

g,h - unifacial miscellaneous tools

i to l - unifacial perforators

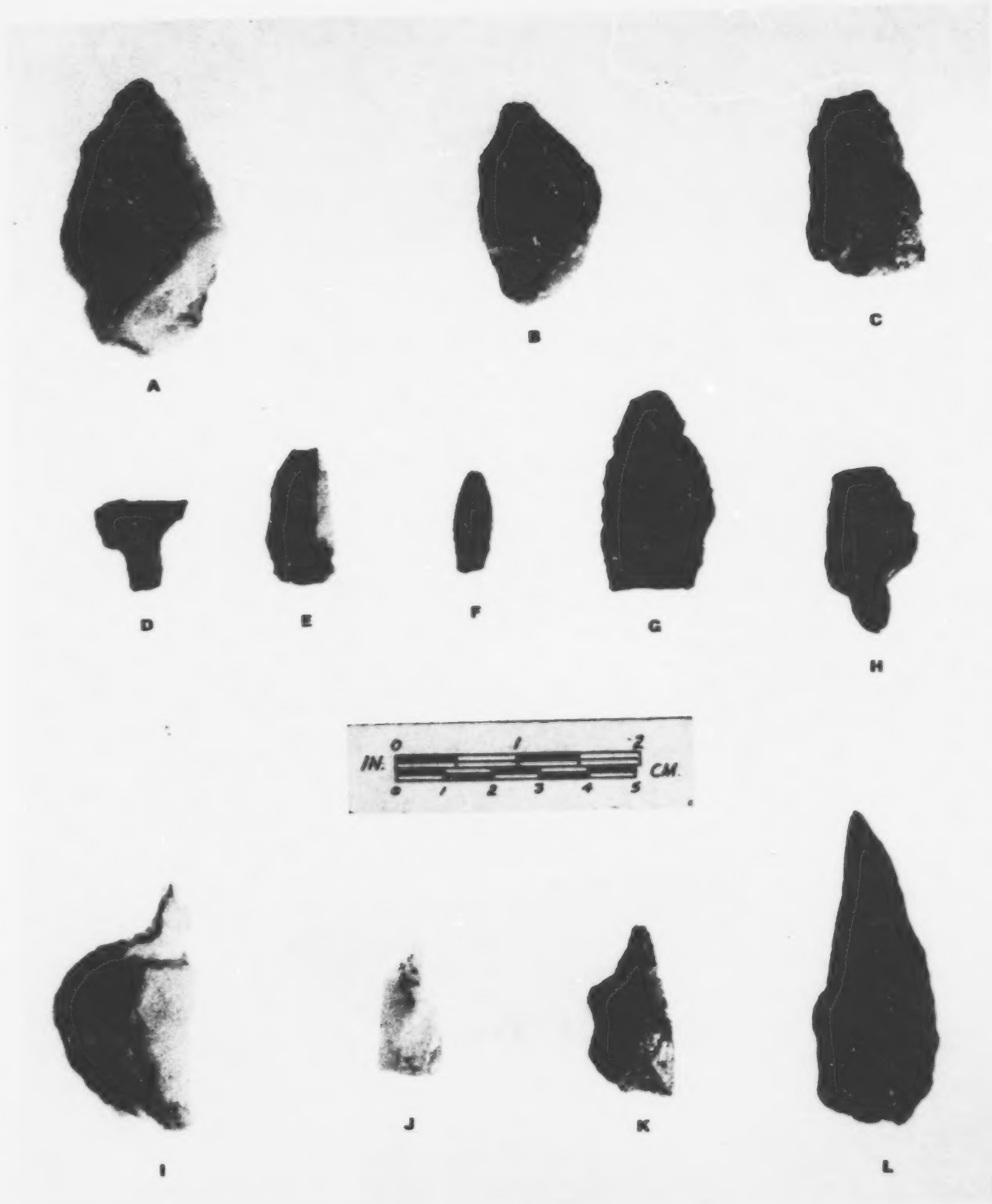


Figure 33

FIGURE 34 - Pittman Site, rough stone tools

a - abrader, Dorset component

b - chopper, Dorset component

c - Ground adze fragment, Archaic component

d - Ground adze fragment, Archaic component

Figure 34